



*Corrective Action Plan
Implementation Work Plan
Building 1349 Study Area*

**Presidio Trust
San Francisco, California**

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Acronyms

AHPA	Archeological and Historic Preservation Act
Army	U.S. Army
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
ATCM	Airborne Toxic Control Measure
bgs	below ground surface
BAAQMD	Bay Area Air Quality Management District
BBL	Blasland, Bouck & Lee
BTEX	benzene, toluene, ethylbenzene, xylenes
CAM 17	17 California Assessment Manual
CAP	Corrective Action Plan for the Building 1349 Study Area
CAP Work Plan	Corrective Action Plan for the Building 1349 Study Area Implementation Work Plan
CCR	California Code of Regulations
CESA	California Endangered Species Act
COC	constituents of concern
DO	Dissolved oxygen
DOT	Department of Transportation
DTSC	Department of Toxic Substances Control
DWR	Department of Water Resources
EKI	Erler & Kalinowski, Inc.
ESLs	Environmental Screening Levels
ESA	Endangered Species Act
FDS	fuel distribution system
FPALDR	Fuel Product Action Level Development Report
FSP	Field Sampling Plan
GGNRA	Golden Gate National Recreational Area
GMPA	General Management Plan Amendment
gpm	gallons per minute
GSA	Federal General Services Agency
IT	International Technology Corporation
LTTD	low temperature thermal desorption
LUCs	land-use controls
LUCMRR	Land Use Control Master Reference Report
MBTA	Migratory Bird Treaty Act
MCL	Maximum Contaminant Level
meq/l	milliequivalents per liter
Mg	Magnesium
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MOA	Memorandum of Agreement
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOA	Naturally Occurring Asbestos
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service

NTU	nephelometric turbidity unit
OCPs	organochlorine pesticides
ORP	oxidation/reduction potential
PAHs	polycyclic aromatic hydrocarbons
PID	photoionization detector
PLLW	Presidio Lower Low Water Datum of 1907
Presidio	Presidio of San Francisco
PTMP	Presidio Trust Management Plan
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RL	reporting limit
RUs	remedial units
SCR	Site Cleanup Requirements
SI	Site Investigation
STLC	Soluble Threshold Limit Concentration
TCLP	Toxicity Characteristic Leaching Procedure
TOC	total organic carbons
TPH	total petroleum hydrocarbon
TPHg	total petroleum hydrocarbons as gasoline
TPHd	total petroleum hydrocarbons as diesel fuel
TPHd-unk	“unknown” fuel hydrocarbons
TPHd-e	extractable total petroleum hydrocarbons
TPHfo	total petroleum hydrocarbons as fuel oil
Trust	Presidio Trust
Trust Act	Section 103 of Omnibus Parks and Public Lands Management Act of 1996, Public Law 104-333, 110 Stat 4097
TTLC	Total Threshold Limit Concentration
UCL	upper confidence limit
USACE	United States Army Corp of Engineers
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compounds
VMP	Presidio Trust Vegetation Management Plan
Water Board	California Regional Water Quality Control Board

1. Introduction

On behalf of the Presidio Trust (Trust), Blasland, Bouck & Lee, Inc. (BBL) has prepared this Corrective Action Plan Implementation Work Plan (CAP Work Plan or Work Plan) for the Building 1349 Study Area at the Presidio of San Francisco (Presidio), San Francisco, California (Study Area or Site). Figure 1-1 presents a Site Location Map. The CAP Work Plan presents the procedures for the implementation of the selected corrective action alternatives for shallow soil, deep soil, and groundwater for the Study Area. Corrective actions for each remedial unit were outlined in the Final Corrective Action Plan (Final CAP) for Building 1349 Study Area (BBL, 2006). The Final CAP was approved by the San Francisco Bay Region of the Regional Water Quality Control Board (Water Board) in a letter dated February 27, 2006.

1.1 Presidio Background

The Presidio is located in the City of San Francisco, at the northern tip of the San Francisco peninsula (Figure 1-1). The Presidio occupies approximately 1,480 acres and is bound by San Francisco Bay on the north and the Pacific Ocean on the west. Densely populated residential areas of San Francisco border the Presidio to the south and east.

The Presidio was a U.S. Army (Army) installation from 1848 through 1994, serving as a mobilization and embarkation point during several overseas conflicts, medical debarkation center, and coastal defense for the San Francisco Bay area. Industrial operations formerly performed at the Presidio were associated with maintenance and repair of vehicles, aircraft, and base facilities. The Presidio also contained several landfills used by the Army to dispose of municipal waste and construction debris.

In December 1988, the Secretary of Defense's Commission on Base Realignment and Closure recommended closure of the Presidio. Under Public Law 92-589, the Presidio was transferred to the National Park Service (NPS) on October 1, 1994, and became part of the Golden Gate National Recreational Area (GGNRA). As required by the Base Realignment and Closure Act, the Army initiated environmental studies in conjunction with the transfer of the property.

Section 103 of the Omnibus Parks and Public Lands Management Act of 1996, Public Law 104-333, 110 Stat. 4097 (Trust Act) created the Trust. The Trust is a federal government corporation established to manage the leasing, maintenance, rehabilitation, and improvement of the non-coastal portions of the Presidio (known as Area B). The Trust manages Area B in accordance with the general objectives of the General Management Plan Amendment (GMPA) (NPS, 1994), Section 1 of the GGNRA Act (Public Law 92-589, 86 Stat. 1299, 16 USC 460bb), and the Presidio Trust Management Plan (PTMP) (Trust, 2002). The NPS retains responsibility for Area A (the coastal portions of the Presidio) in accordance with the GMPA. The Trust assumed responsibility for remediation of both Areas A and B of the Presidio on May 24, 1999 by signing the Presidio Memorandum of Agreement (MOA) and Area A MOA. In addition, the Trust also entered into a Consent Agreement with DTSC and NPS on August 30, 1999 (DTSC, Trust, and NPS, 1999).

1.2 Study Area Background

The Study Area is located in the western portion of the Presidio, approximately 300 to 320 feet above the Presidio lower low water datum of 1907 (PLLW), and sits on a topographic high point on the boundary between the Marina Groundwater Basin and the Coastal Bluffs Groundwater Basin. The Study Area is delineated by

Former Fill Site 5 and the western edge of Washington Boulevard to the west, Kobbe Avenue to the north, and Harrison Boulevard to the east (Figure 1-2). Former Fill Site 5 is located to the west of the Study Area and Former Landfill 4 is located to the east-southeast. The Study Area is located in the Presidio Forest planning area on the border of the Coastal Bluffs planning area in Area B of the Presidio and subject to land uses identified in the PTMP (Trust, 2002). Current and planned future land use at Building 1349 Area is recreational with special-status ecological species potentially present [Erler and Kalinowski, Inc. (EKI), 2002].

The Building 1349 location was originally occupied by an aboveground storage tank (AST) built in 1906 in conjunction with the Presidio-Wide Fuel Distribution System (FDS). The AST was used to store fuel-heating oil that was distributed throughout the Presidio using the former FDS. The AST was approximately 100,000 gallons. The AST was replaced by Building 1349 in the early 1950s. Figure 1-2 presents the location of the former AST and associated FDS piping. The FDS was decommissioned in sections beginning in the 1940s and ending in the early 1960s.

Building 1349 was a 100,000-gallon steel AST built in the 1950s (Former Building 1349 Tank on Figure 1-2). The AST (Building 1349) was used to store fuel oil and diesel fuel which was off-loaded to tanker trucks for transportation to various locations in the Presidio.

The United States Army Corp of Engineers (USACE) retained International Technology Corporation (IT) to perform the closure of Building 1349 in 1995. Closure activities occurred in October and November 1995 including removal of Building 1349 and its associated piping and excavation of fuel-contaminated soil associated with former fueling operations at the Study Area. Beginning in 1996, IT also conducted an FDS pipeline removal and abandonment project and removed the FDS pipelines within the Study Area (IT, 1999).

1.2.1 Geology and Hydrogeology

The following sections summarize the regional and site-specific geologic and hydrogeologic conditions in the vicinity of the Study Area. Detailed descriptions and discussions of geology and hydrogeology for the Study Area are located in the Final CAP (BBL, 2005).

1.2.1.1 Geologic Setting and Regional Geology Summary

The Study Area is located on a prominent hill that slopes gently to the east-northeast and steeply to the west-southwest towards Baker Beach and the Pacific Ocean. Ground surface elevations range from approximately 320 to 300 feet PLLW in the immediate area (Figure 1-3). The Study Area is located in the California Coastal Range Physiographic Provenance. The local geology consists of Franciscan Formation bedrock units overlaid by various overburden deposits. The Franciscan Formation consists of a complex assemblage of sedimentary, volcanic, and metamorphic rocks ranging in age from the Late Jurassic to the Late Cretaceous with intense folding, faulting, and shearing of the formation. In the San Francisco area, the Franciscan Formation consists primarily of sandstone, shale, siltstone, radiolarian chert, and mafic igneous rocks such as serpentinite (Schlocker, 1974). The Study Area lies in an active seismic zone located between two major north-west trending fault systems, the Hayward/Rogers Creek system and the San Andreas system.

Three main soil types are recognized at the Presidio. These include serpentinite soil, Colma Formation, and beach dune sand (EKI, 2002). The Colma Formation and beach dune sand are both unconsolidated sediments deposited on top of bedrock. Serpentinite soil is derived from serpentinite bedrock. As described above, serpentinite is a distinctive greenish-gray to bluish-gray rock that tends to weather to poorly formed soil in a

wide range of grain sizes. The Colma Formation is Pleistocene in age and consists of fine- to medium-grained sand with moderate amounts of silt and clay that was deposited in estuarine and coastal environments. Beach dune sand is characterized at the Presidio as highly permeable, clean, well-sorted sand that is yellowish brown to light gray in color.

Several secondary soil types are also recognized at the Presidio, including Quaternary slope debris and ravine fill. Slope debris and ravine fill is described as highly variable combinations and percentages of silts, clays, sands, and gravels. The slope debris and ravine fill is generally associated with landslide deposits and soil derived from any of the three main soil types recognized in the Presidio (Colma Formation, beach dune sand, and serpentinite) (EKI, 2002).

1.2.1.2 Study Area Geology

Figure 1-3 presents a conceptual stratigraphic cross-section across the Study Area. Soil borings at the Study Area indicate that unconsolidated overburden deposits range from approximately 10 to 40 feet thick. These unconsolidated overburden deposits overlie Franciscan Formation bedrock.

Overburden

Soil beneath the Study Area generally consists of Quaternary slope debris and ravine fill. A review of boring logs from previous site investigations (SIs) (Montgomery Watson, 1995a and 1996; Treadwell & Rollo, 2003a) indicates that beach dune sand is not present in the Study Area. These boring logs indicate that overburden soil throughout the Study Area consist of relatively low permeability silty sand and silty clay. The description of these deposits is consistent with slope debris and ravine fill, not the highly permeable, clean, and well sorted beach dune sand. The overburden deposits in the Study Area also have frequently been noted to contain weathered fragments of local bedrock. The local bedrock is described below.

The slope debris and ravine fill found at the Study Area appear to be derived from serpentinite soil and the underlying Franciscan Formation. The slope debris and ravine fill deposits at the Study Area are expected to contain materials with geochemical characteristics of the serpentinite soil types as well as the shales, siltstones, sandstones, and serpentinite.

Bedrock

The slope debris and ravine fill unit overlie Franciscan Formation bedrock (Figure 1-3). The Franciscan Formation has been observed in the Study Area and is interpreted to be approximately 10 to 40 feet below ground surface (bgs). Based on drilling conditions and boring logs, it appears that the upper 45 feet of the Franciscan Formation is highly weathered, fractured bedrock with interbedded zones consisting of weathered clay and silt. The Franciscan Formation in the Study Area consists primarily of serpentinite, Sheared Rock, and Jurassic/Cretaceous Sedimentary Rock units.

In June 1994, Resolution Resources, Inc. conducted a high-resolution seismic reflection survey at the Study Area to further assess the depth to the bedrock surface and determine whether seismic faults are present. The results of the survey indicated that many fault and fracture zones bisect the Study Area (Montgomery Watson, 1996).

Based on a review of boring logs in the vicinity of the Study Area, up to three apparent faults were identified (Figure 1-3). The faults appear to displace two distinct blocks of the Franciscan Formation consisting mainly of

serpentine relatively upward from two blocks of Franciscan Formation consisting of mainly siltstone and shale. The southeastern-most interpreted fault is believed to trend approximately northeast to southwest. It is likely that other interpreted faults may parallel this fault trend orientation.

1.2.1.3 Groundwater Monitoring Well Network Description

The Study Area is located on a topographic high point and local groundwater recharge zone at the boundary of the Marina Groundwater Basin and the Coastal Bluffs Groundwater Basin. A total of nine monitoring wells are associated with the Study Area. Five additional monitoring wells are located to the west-southwest of the Building 1349 Study area in adjacent Former Fill Site 5. The fourteen monitoring wells are used to evaluate hydraulic conditions at the Study Area.

The Study Area monitoring wells are constructed with their well screen intervals within the Franciscan Formation. Well screens are between 10 and 17 feet long with the top of screen elevations ranging between approximately 272 to 285 feet PLLW. The top of the well screens are located between 5 and 28 feet below the top of bedrock. The screened intervals for Study Area monitoring wells generally intersect the apparent static water level at each location.

1.2.1.4 Groundwater Occurrence and Flow

Apparent static groundwater elevations (groundwater elevations) occur at approximately 288 to 270 feet PLLW at Study Area monitoring wells. Groundwater elevations decrease to the southwest of the Study Area to approximately 220 feet PLLW in the adjacent Former Fill Site 5 area (Table 1-1 and Figure 1-4). Average depth to groundwater ranges between 26 feet bgs at well 1349MW102 and 37 feet bgs at well 1349MW103. Groundwater elevation data from First Quarter 2005 show that groundwater elevations in some Study Area wells were much higher than those typically observed in the past. This is likely attributed to higher than normal seasonal precipitation. Seasonal groundwater seeps are reported to occur more than 500 feet to the south-southwest of the Study Area, at the western edge of Former Fill Site 5.

Groundwater at the Study Area occurs primarily within the Franciscan Formation. As noted previously, the Franciscan Formation is highly deformed and fractured. Groundwater flow occurs within secondary porosity created by the fracture networks and the relative permeability is expected to be variable, but generally low based on the amount of secondary mineralization in individual fractures. It has been estimated that hydraulic conductivities vary, ranging between 1×10^{-4} to 1.6×10^{-3} cm/sec, and specific yields of wells are as low as 0.2 gallons per minute (gpm) (BBL, 2005). The combination of low permeability, relatively low hydraulic gradients, and anisotropy combine to make interpretation of local groundwater flow direction proximate to the Marina and Coastal Bluffs groundwater basin divide challenging.

Figure 1-4 depicts the typical groundwater elevations at the Study Area and the adjacent Former Fill Site 5 area. Analysis of the potentiometric data indicates that a relatively steep hydraulic gradient exists to the southwest of the Study Area near Former Fill Site 5. Based on potentiometric data in that area, the apparent groundwater flow direction is to the southwest from monitoring well 1349MW102 towards well LF5GW100. However, the potentiometric surface beneath most of the Study Area is indicative of a recharge area and is relatively flat with a general radial flow pattern. Within this area, groundwater elevation data indicate two localized potentiometric highs both to the southwest and northeast of Washington Boulevard and separated by a slight potentiometric low in the vicinity of well 1349MW100. The highest potentiometric elevation typically is found at well 1349MW102, however 1349MW101 has had the highest potentiometric elevation on occasion. The relative

potentiometric highs and lows observed on Figure 1-4 are consistent with historic groundwater elevation data seen in Table 1-1. Furthermore, the high groundwater elevation at well 1349MW102 and 1349MW101 is noted to be in close proximity to the groundwater basin boundary depicted in Figure 1-4 from the Cleanup Levels Document (EKI, 2002).

Recent groundwater elevation data (Treadwell and Rollo, 2005 and 2005a) indicate slight variability in the apparent groundwater flow direction in the vicinity of the interpreted groundwater basin boundary. Historically, groundwater flow directions in the area of the groundwater basin boundary are interpreted to be in the northeasterly direction, with the exception of the Fourth Quarter 2003 and during the Third and Fourth Quarters 2004, groundwater flow in this area was interpreted to the northwest (Treadwell & Rollo, 2005a). Such local variations are likely a result of changes in seasonal recharge, infiltration and evapotranspiration rates. These subtle variations are typical of those observed in fractured bedrock aquifer recharge areas and data suggests that overall hydraulic gradients are still relatively flat with a general radial flow pattern. It should also be noted, that subtle variations in apparent groundwater elevations are likely influenced by the shape of the bedrock surface and the orientation of known fault zones. These features may also influence the apparent groundwater flow direction, especially towards the west of wells 1349MW100 and 1349MW102.

1.2.1.5 Summary of Hydrogeologic Conditions

Based on the evaluation of groundwater elevation data and geochemical data, it is apparent that groundwater flow in the Study Area is anisotropic, influenced by the fracture flow network and bedrock geometry (BBL, 2005). A general radial flow pattern exists in the vicinity of the groundwater divide and recharge area and temporal variations in apparent groundwater flow direction, while minor, may be observed based on local recharge conditions. The direction of groundwater flow becomes more consistent and better defined with distance away from the groundwater divide, with flow to the east (the Marina Groundwater Basin) and to the west (the Coastal Bluffs Groundwater Basin). The existing groundwater monitoring well network is sufficient for monitoring groundwater hydrogeologic conditions to the east of the apparent groundwater basin divide as well as to the west, north and south of Washington Boulevard.

1.2.2 Source Areas

This section presents a summary of the potential sources of contaminant releases at the Study Area, including operational histories. Based on a review of the known Site history (Section 1.2), the following contaminant source areas have been identified for the Study Area:

- Former Fuel Oil AST: Former Building 1349 contained a 100,000-gallon fuel oil AST which was constructed in 1906 in association with the FDS. Fuel oil was stored in the AST and distributed throughout the Presidio via the FDS.
- Former Diesel Oil AST (Former Building 1349): The fuel oil AST was replaced in the 1950s by a 100,000-gallon steel AST. The replacement AST was initially used for fuel oil storage and then was converted to diesel fuel storage. A fuel dispensing structure was reportedly installed along Washington Boulevard for dispensing the diesel from the tank to fuel trucks which would then transport the diesel to various locations throughout the Presidio. An underground pipe connected the AST to the fuel dispensing structure.

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- Former FDS Piping: The FDS, a network of pipelines built in the early 1900s, distributed fuel oil throughout the Presidio. The FDS ceased operations and was decommissioned in sections beginning in the 1940s and ending in the early 1960s.

1.2.3 Telecommunications Corridor

A telecommunications conduit is located on the eastern side of Washington Boulevard (Figure 1-2). This conduit contains a fiber-optic telecommunications cable owned by the Trust. The conduit is approximately two-feet to 2.5-feet wide and 2.5-feet deep. The top of the conduit occurs at approximately one-foot below grade. The telecommunications corridor is located within the Study Area.

1.2.4 Previous Removal Actions

This section summarizes previous corrective actions and site investigation conducted for the Study Area. Table 1-2 also presents a summary of these activities for the Study Area. Detailed descriptions of previous remedial investigations and corrective actions are presented in the Final CAP (BBL, 2005).

Two previous corrective actions by the Army have occurred at the Study Area involving (1) the demolition and removal of Building 1349 and its associated piping and (2) the removal of the former FDS at the Study Area. Table 1-2 summarizes previous removal actions for the Study Area. There is no information regarding the removal of the former AST which was replaced by the Building 1349 AST in the early 1950s. Past corrective actions have effectively addressed the majority of petroleum-related impacts in the Study Area. The CAP proposed corrective actions for the remaining petroleum-related impacts, some of which are located in areas where corrective actions have proven to be difficult due to sensitive Study Area infrastructure and geologic conditions. In addition, a supplemental FDS investigation and more comprehensive site investigation were performed after the former AST and FDS closure reported were completed.

Chemical analytical results presented in Table 1-2 are discussed in the context of action levels and/or screening levels that were used at the time of each investigation or corrective action, where available. These action levels and/or screening levels for petroleum hydrocarbons are equivalent to the Site Cleanup Requirements (SCRs) adopted by the Water Board in Order No. R2-2003-0080 (Water Board, 2003a) for the Presidio and the cleanup levels selected in the CAP. Action levels and/or screening levels for previous corrective actions and site investigations are described in detail in the Final CAP (BBL, 2005).

1.3 Nature and Extent of Contamination

This section presents an analysis of the nature and extent of contamination in soil and groundwater at the Study Area based on the potential source areas and results of previous investigations. For the identification of impacted areas, analytical results for constituents of concern were compared with cleanup levels for soil and groundwater. Tables 1-3 and 1-4 present soil and groundwater cleanup goals, respectively. Cleanup levels for petroleum constituents in soil include human health (residential) from ground surface to 10 feet bgs, ecological (terrestrial) from ground surface to three feet bgs, and protection of groundwater resources (greater than 10 feet bgs). Cleanup levels for metals in soil include human health (residential) from ground surface to 10 feet bgs, ecological (special-status) from ground surface to 3 feet bgs, and background concentrations predominantly for serpentinite soil. Cleanup levels for groundwater include drinking water levels [Maximum Contaminant Levels

(MCLs) or risk-based standards]. Section 2 discusses cleanup levels for soil and groundwater for the Study Area.

This discussion presents data representing current conditions in soil at the Study Area. Therefore, sample results associated with soil that were removed during the AST and FDS removal actions are not included to evaluate current nature and extent of contamination remaining in soil at the Study Area.

1.3.1 Nature and Extent of Contamination in Soil

Below is a discussion of the nature and extent of constituents of concern (COCs) in soil at the Study Area. In summary, the following compounds have been selected as COC for shallow and deep soil in the Study Area:

- COC for shallow soil are TPH as diesel fuel (TPHd), TPH as fuel oil (TPHfo), benzo(a)pyrene, dibenzo(a,h)anthracene, and chrysene;
- The COC for deep soil is TPHd; and
- COC for the telecommunications corridor are TPHd, benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene.

Below is a discussion of the nature and extent of these constituents of concern in soil at the Study Area. Figures 1-5 through 1-7 present COC detected above soil cleanup criteria.

Petroleum-Related Compounds

Analytical results for soil indicate that TPHd, including unknown fuel hydrocarbons (d-unk) and extractable TPH (TPHd-e), TPHfo, and polycyclic aromatic hydrocarbons (PAHs) are present at concentrations above applicable soil cleanup levels at the Study Area. Figures 1-5 through 1-6 present indicate that soil contamination falls into two general zones: shallow soil and deep soil. In addition, residual contamination associated with the telecommunications corridor is a third zone of soil contamination (Figure 1-7). These zones are summarized below.

- Shallow Soil (0 to 10 feet bgs): Soil analytical results indicate the following constituents were detected at concentrations above applicable soil cleanup levels: TPHd (including TPHd-unk and TPHd-e), TPHfo, total TPH (by immunoassay, assumed to be representative of TPHd or TPHfo), benzo(a)pyrene, dibenzo(a,h)anthracene, and chrysene. Three areas of shallow soil contamination are present at the Study Area as shown on Figure 1-5. Shallow soil contamination in soil is summarized as follows for the Study Area:
 - *North of Former Building 1349 (Shallow Soil Area 1):* An area extending approximately 20 to 90 feet north of the former Building 1349 in the vicinity of the previous FDS excavations contains TPH and PAHs above cleanup levels. The volume of impacted soil is estimated to be approximately 630 cubic yards.
 - *North FDS (Shallow Soil Area 2):* Shallow soil along a former FDS pipeline contains PAHs above cleanup levels in two areas (around borings 1349SB112 and -113). The total volume of impacted soil is estimated to be approximately 30 cubic yards.

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- *Northeast of Telecommunications Corridor and Southeast of Former Building 1349 (Shallow Soil Area 3):* An area approximately five to 10 feet east to northeast of the telecommunications conduit contains TPHd-e above cleanup levels. The volume of impacted soil is estimated to be approximately 150 cubic yards.
 - Deep Soil (Greater than 10 feet bgs – Deep Soil Unit): Soil in the vicinity of 1349SB127 is impacted with TPHd at concentrations above applicable soil cleanup levels. This area of deep soil contamination is located within the boundaries of the shallow soil contamination area north of the former Building 1349. Based on results of soil samples, contamination extends vertically to approximately 20 feet bgs. The volume of impacted soil is estimated to be approximately 30 cubic yards. Figure 1-6 presents the extent of deep soil impacts.
 - Shallow and Deep Soil Adjacent to the Telecommunications Corridor (Communications Conduit Unit): Impacted soil was left in-place in the vicinity of the telecommunications corridor during the previous removal action. TPHd and PAHs were detected in soil in this area above applicable soil cleanup levels. The volume of impacted soil is estimated to be approximately 570 cubic yards. Figure 1-7 presents the extent of soil impacts adjacent to the telecommunications corridor.

Metals

Metals detected in soil above applicable cleanup levels in the Final CAP (BBL, 2006) are limited to arsenic and vanadium in the Study Area. Serpentine is the predominant soil lithology in the Study Area. Therefore, serpentine background concentrations were used for an initial screening to assess the presence of metals above background in the Study Area.

The applicable soil cleanup level based on background threshold concentration for arsenic in serpentine soil is 5.4 mg/kg. Arsenic was detected above the background concentration in six samples within the 0 to 10 foot depth interval at concentrations ranging from 5.6 to 9.5 mg/kg. Four of these detections were in samples collected at 10 feet bgs (Soil borings 1349SB02, -03, -10, and -12). Detections of arsenic above the background serpentine concentration of 5.4 mg/kg were limited to two samples collected in shallower soil (Soil borings 1349SB04 at four feet bgs and 1349SB05 at five feet bgs).

Vanadium was detected slightly above the cleanup level based on the serpentine background concentration (74 mg/kg) at a concentration of 77.4 mg/kg in soil sample 1349SB01 at one-foot bgs. The 95 percent upper confidence limit (UCL) concentration for vanadium remaining in Study Area soil from 0 to 3 feet bgs is below the serpentine background concentration at 70.2 mg/kg.

Based on evaluations performed in the 1995 SI Report (Montgomery Watson, 1995) and Final CAP (BBL, 2005), residual metals concentrations in soil at the Study Area are below cleanup levels and/or are naturally occurring.

OCPs

Organochlorine pesticides (OCPs) have not been analyzed in soil samples at the Study Area. Based on the results of groundwater monitoring, OCPs appear to be limited to the area around well 1349MW100. Soil in this area was previously excavated to a depth of 12 feet bgs during the AST removal program (Section 1.2.4). Therefore, OCPs are not expected to be currently present in soil at levels that would pose a risk to human health or the environment at the Study Area.

1.3.2 Nature and Extent of Contamination in Groundwater

Below is a discussion of the nature and extent of COC in groundwater at the Study Area. In summary, the following compounds have been selected as COC for groundwater in the Study Area:

- TPHd and TPH as gasoline (TPHg);
- benzene;
- PAHs;
- OCPs; and
- arsenic.

Figure 1-8 presents COC detected above applicable cleanup levels. Although not retained as COC, dissolved metals such as chromium and nickel will continue to be monitored at the Study Area.

TPH

TPHd was detected at elevated concentrations in grab groundwater samples from four locations from the 1995 to 1996 SI (1349SB25, -27, -22, and -19) and three locations from the 2003 SI (1349SB111, -108, and -103); however, TPHd was not detected in groundwater samples from monitoring wells installed upgradient and downgradient of these boring locations. Groundwater samples have been collected quarterly or semi-annually from these wells since the second quarter of 2003. Detections of TPHd and TPHg above the cleanup level have been limited to monitoring well 1349MW100.

VOCs

Of benzene, toluene, ethylbenzene, and xylenes (BTEX), benzene is the only compound detected above the cleanup level in monitoring wells. Benzene has consistently been detected above the cleanup level monitoring well 1349MW100. The low benzene concentration detected in well 1349MW02 was non-repeatable.

PAHs

Benzo(a)anthracene has been detected at concentrations above the cleanup level in monitoring well 1349MW100. Dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene were detected above cleanup levels in groundwater monitoring well 1349MW03 in November 2001; however, the well was subsequently abandoned in 2002. PAHs were not detected in the well over the three quarters of sampling conducted in 2002.

OCPs

Consistent detections of OCP compounds above applicable groundwater cleanup levels have been limited to monitoring well 1349MW100. Detected concentrations of OCPs in adjacent monitoring well in the Study Area and Former Fill Site 5 have been below the applicable cleanup levels for the Study Area. Additionally, OCPs have been detected inconsistently and at estimated concentrations below laboratory reporting limits (RLs) in downgradient monitoring wells in Former Fill Site 5. Based on historic analytical results, detections of OCP compounds above cleanup levels are localized around monitoring well 1349MW100.

Metals

Dissolved metals have been detected in Study Area monitoring wells at concentrations above cleanup level as follows:

-
- Total chromium has been detected at concentrations above the groundwater cleanup level (50 µg/L) in monitoring wells 1349MW02, 1349MW03, and 1349MW03R.
 - Arsenic was detected at concentrations above the groundwater cleanup level (10 µg/L) in monitoring wells 1349MW01, 1349MW100, and 1349MW105.
 - Nickel was detected at concentrations above the groundwater cleanup level (100 µg/L) in monitoring well 1349MW103.

Concentrations and distributions of metals in groundwater samples indicate concentrations do not represent significant impacts associated with past activities at the Study Area. Limited detections of metals above cleanup levels may reflect naturally occurring metals in soil. As discussed in the Final CAP, elevated naturally occurring chromium has been documented in groundwater studies throughout the Presidio (EKI, 2002). In addition, the elevated concentrations of chromium and nickel are related to naturally occurring chromium and nickel in serpentinite (EKI, 2002). Therefore, chromium and nickel were eliminated as COC for groundwater.

1.4 Approved Corrective Action

Based on the detection of COC above cleanup levels, the following remedial units (RUs) have been selected for the Study Area:

- Shallow Soil (0 to 10 feet bgs);
- Deep Soil (>10 feet bgs);
- Telecommunications Corridor Soil; and
- Groundwater.

Shallow soil, deep soil, and telecommunications corridor soil with concentrations of COC above cleanup levels will be excavated and removed for off-site disposal. Groundwater with concentrations of COC above cleanup criteria will be monitored and land use controls will be applied to the Study Area.

The lateral and vertical extent of the RUs is based on the evaluation of the location of former source areas and presence of COC above cleanup levels using previous data collected at the Study Area. In some cases, the limits of the RUs are not well delineated by sample data. In these cases, assumptions were made based on the limited data. Final limits of the RUs for soil will be verified by confirmation samples (Sections 3.2.5).

1.4.1 Shallow Soil

The Shallow Soil RU is comprised of three distinct areas (Areas 1 through 3) as follows:

- Shallow Soil Area 1: Area 1 encompasses the Former FDS remedial excavation areas (Figure 1-9). The southern, western, and northern boundaries of this RU are delineated by SI, FDS, and AST remedial excavation samples. Although the eastern boundary of the RU is not well delineated by samples, the boundary is anticipated to be in the vicinity of the former FDS pipelines. The vertical limit of this RU is approximately 10 feet bgs. COC have been detected above cleanup criteria in this area in soil to 20 feet bgs; however, a vertical limit of 10 feet bgs was selected for Shallow Soil Area 1 because different cleanup levels apply to the shallow soil interval (0 to 10 feet bgs) and deeper soil interval (greater than

10 feet). Section 1.4.2 presents the selected remedy for contamination extending deeper than 10 feet bgs as part of the Deep Soil RU. The approximate volume of soil to be removed within Shallow Soil Area 1 is 630 cubic yards.

- **Shallow Soil Area 2:** Area 2 encompasses two small areas along the northern end of the former FDS pipeline within the Study Area (Figure 1-9). The lateral extent of this RU is likely limited to the vicinity of the former FDS pipelines. The vertical extent of the COC above cleanup criteria in Area 2 is estimated to be approximately three feet bgs and limited to the trench backfill material containing COC above the cleanup levels. The approximate volume of soil to be removed within Shallow Soil Area 2 is 30 cubic yards.
- **Shallow Soil Area 3:** Area 3 encompasses an area directly northeast of the telecommunications conduit (Figure 1-9). This area includes residual soil contamination left in-place beneath the AST removal excavation Area 2. The lateral extent of this RU is limited to the area surrounded by the former excavation boundary as post-excavation confirmation samples collected in the area confirmed that cleanup levels were achieved in the area. The vertical extent of this unit ranges from between two to eight feet bgs to a maximum of 10 feet bgs. The approximate volume of soil to be removed within Shallow Soil Area 3 is 150 cubic yards.

The approved corrective action alternative for the Shallow Soil RU is excavation and off-site disposal. Section 3 presents additional details on the implementation of the approved corrective action.

1.4.2 Deep Soil

The Deep Soil RU includes soil within a small area around soil boring 1349SB127 at depths greater than 10 feet bgs (Figure 1-9). The lateral extent of this RU is delineated to the north, south, and east by borings 1349SB127, -125, and -126, respectively. COC were not detected above applicable soil cleanup criteria in samples collected from these three borings from 10 to 25 feet bgs. The lateral extent of the Deep Soil RU is not well delineated to the west with the exception of soil boring 1349SB24 located approximately 50 feet away. Based on detections of COC above cleanup levels in a soil sample collected at 20 feet bgs, the vertical extent of this RU is assumed to be approximately 22 feet bgs. COC were not detected above cleanup levels in the sample collected at 25 feet bgs. The approximate volume of soil to be removed in the Deep Soil RU is 30 cubic yards.

The approved corrective action alternative for the Deep Soil RU is excavation and off-site disposal. Section 3 presents additional details on the implementation of the approved corrective action.

1.4.3 Telecommunications Corridor Soil

The Telecommunications Corridor Soil RU is a wedge-shaped mass of impacted soil beneath the telecommunications line adjacent to Washington Boulevard (Figure 1-9). This soil was left in place after previous remedial excavations on the east and west sides of the telecommunications conduit that runs along the east side of Washington Boulevard because, at the time, it was technically impractical to remove it without jeopardizing the integrity of the conduit which contained critical fiber optic communication lines. Currently, the telecommunication conduit contains less-sensitive Trust computer lines and standard protection in place devices can adequately mitigate damage. The conduit is approximately two to 2.5-feet wide and 2.5-feet deep. The top of the conduit is located at approximately one-foot below grade. Based on the maximum depth of the previous soil removal activities in this area, the vertical extent of this RU is assumed to extend deeper than 12 feet bgs.

The contamination may extend to groundwater which is approximately 30 feet bgs. An area of approximately 965 square feet will be excavated to a depth of 16 feet bgs. The approximate volume of soil to be removed in the Telecommunications Corridor Soil RU is 570 cubic yards.

The approved corrective action alternative for the Telecommunications Corridor Soil RU is excavation and off-site disposal. Section 3 presents additional details on the implementation of the approved corrective action.

1.4.4 Groundwater

Based on groundwater monitoring results, the Groundwater RU is limited to an area around monitoring well 1349MW100 in the middle of the Former Building 1349 Area 2 and 3 remedial excavations on the western part of the Study Area. TPHg, TPHd, benzene, PAHs, arsenic, and OCPs have been detected above their respective cleanup criteria as shown on Figure 1-8. Due to the consistent detection of arsenic above the cleanup level due to hydrogeochemical alterations of groundwater from petroleum hydrocarbon impacts, the Groundwater RU also includes monitoring well 1349MW105 as described in the Final CAP (BBL, 2005).

The approved corrective action alternative for the Groundwater RU is groundwater monitoring with the application of land use controls. Section 3 presents additional details on the implementation of the approved corrective action for groundwater.

2. Applicable Cleanup Levels

As discussed above, soil and groundwater impacts include petroleum-related compounds, metals, and OCPs for the Study Area. Soil and groundwater cleanup levels for COCs are summarized below. These cleanup levels were established in the Final CAP (BBL, 2006).

2.1 Cleanup Levels for Soil

In the Final CAP, the applicable cleanup levels detected in soil were identified and include clean up levels based on:

- Protection of Human Health, Residential Use;
- Protection of Ecological Receptors, Terrestrial and Special Status Species;
- Background Concentrations for Serpentine Soils; and
- Protection of Groundwater Resources at Drinking Water Levels.

The most stringent of the level, above, was selected as the cleanup level for each compound, except in cases where metals background concentrations were higher, in which case background concentrations were selected as the applicable cleanup levels.

Site cleanup levels are presented in Table 1-3 for compounds detected in soil. The Presidio-Wide Quality Assurance Project Plan (QAPP) analytical RLs and laboratory RLs are also listed (Tetra Tech, 2001). Although in several cases the QAPP analytical RLs are above the cleanup levels, the laboratory RLs are below the cleanup levels for all compounds listed.

2.2 Cleanup Levels for Groundwater

In the Final CAP, drinking water levels were selected as groundwater cleanup objectives in accordance with the Water Board's Basin Plan and Order No. R2-2003-0080. The Basin Plan and Water Board Order designate municipal and domestic supply as a beneficial use for groundwater within the Marina and Coastal Bluffs Groundwater Basins. However, potential for future groundwater development for supply is extremely low due to the complex hydrology in the vicinity of the Study Area and technical limitations, including low specific yield of wells in the area.

Drinking water cleanup levels from the Cleanup Levels Document (EKI, 2002), which consist of either MCLs or risk-based drinking water standards, were selected as cleanup levels for the Study Area. For several COCs, drinking water standards are not available. In these cases, drinking water Environmental Screening Levels (ESLs) developed by the RWQCB were selected as cleanup levels (Water Board, 2003b). Values for surface water or freshwater seeps were not considered applicable to the Study Area because the nearest identified seep is over 500 feet from the Site and southwest of Former Fill Site 5 (Treadwell & Rollo, 2003a).

Site-specific groundwater cleanup levels are presented in Table 1-4. The QAPP analytical RLs and laboratory RLs are also presented in the above table (Tetra Tech, 2001). The laboratory RLs are below the cleanup levels for COC with the exception of dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, aldrin, heptachlor, and heptachlor epoxide. Therefore, laboratory RLs were selected as cleanup levels for these five chemicals.

3. Description of Corrective Action

This section presents a description of the approved corrective action for shallow soil, deep soil, telecommunications corridor soil, and groundwater at the Site. The approved corrective action consists of the following primary elements:

- excavating shallow soil with concentrations of COC above cleanup levels in Shallow Soil RU Areas 1, 2, and 3;
- excavating deep soil with concentrations of COC above cleanup levels around soil boring/monitoring well 1349SB127/1349MW103 in the Deep Soil RU ;
- excavating soil with concentrations of COC above cleanup levels beneath the Telecommunications Corridor Soil RU;
- conduct post-excavation confirmation sampling in all soil RUs to confirm that corrective action objectives have been met;
- performing over-excavation activities, as necessary, based on results of post-excavation confirmation sampling;
- performing waste classification sampling for off-site disposal;
- transporting and disposing of excavated material at an approved waste disposal facility;
- backfilling and restoring excavations to existing grade;
- abandoning groundwater monitoring well 1349MW103 located within the Deep Soil RU;
- potentially abandoning groundwater monitoring well 1349MW100 which is immediately adjacent to the Telecommunications Corridor Soil RU. Reasonable efforts will be taken to preserve the integrity of adjacent monitoring well 1349MW100, but depending on lateral extent of COCs within the RU and excavation constructability issues, 1349MW100 may need to be abandoned and re-installed after completion of soil corrective actions
- installing one replacement groundwater monitoring well, 1349MW103R for abandoned well 1349MW103 and replacing groundwater monitoring well 1349MW100 with 1349MW100R, as necessary;
- installing two new groundwater monitoring wells (1349MW106 and 1349MW107);
- sampling groundwater monitoring wells, initially, on a quarterly basis from 11 wells – the number of monitored wells and frequency may change as described in Section 3.3;
- potentially implementing land use controls (LUCs) for soil where technical infeasibility issues are encounter with the approved corrective action which would require soils in excess of the clean up objectives to be left in place; and

-
- implementing LUCs for Study Area groundwater.

Corrective action activities will be conducted in accordance with the following:

- Final CAP,
- CAP Work Plan, including the following elements:
 - Dust and Perimeter Air Monitoring Plan (Appendix A);
 - Transportation and Traffic Control Plan (Appendix B),
- Presidio-wide Quality Assurance Project Plan, (QAPP - Tetra Tech, 2001) and Standard Operating Procedures (SOPs) contained within; and
- Field Sampling Plan, Presidio Groundwater Monitoring Project (FSP; Treadwell and Rollo, 2001).

The corrective action will be in conformance with applicable state and federal laws and regulations as identified in the Final CAP. Applicable regulations and requirements pertain to the protection of park resources, the definition of hazardous wastes, the handling, transport and disposal of those wastes, the control of dust and other pollutant emissions and other applicable construction related activities.

The Trust will notify the appropriate regulatory agencies, including the Water Board, and the NPS a minimum of two weeks prior to the start of excavation activities. All applicable and relevant review processes will be completed before excavation work begins. The Trust will review relevant aspects of the corrective action in their National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) review processes which are combined into a single review referred to as “N²”.

Elements of the corrective action activities are discussed in the following sections. Table 3-1 summarizes COCs for each RU.

3.1 Construction Documents, Management and Sequencing

The following sections describe the development of construction Contractor Bid Specifications and Design Package, selection of remedial construction contractor, construction management and sequencing.

3.1.1 Construction Documents and Selection of Remedial Contractor

On behalf of the Trust, BBL will prepare a Building 1349 CAP Implementation Contractor Bid Specifications and Design Package (Bid Package). The Bid Package will be developed in accordance with the provisions of this Work Plan and the Final CAP. The Bid Package will be developed concurrently with this Work Plan. The Bid Package will set forth the contractual performance obligations and costs bid sheet for completing the approved corrective actions for soils at the Building 1349 Area. The final Bid Package will be submitted as a Request for Services by the Trust to their qualified vendor list for remedial construction contractors. The Trust will use typical decision criteria to select a Contractor based on the responses to the Request for Services.

Remedial construction activities such as excavation, site preparation, site security (i.e. temporary fencing), dust and erosion management, will be conducted by a remedial construction contractor (Contractor) contracted directly by the Trust.

3.1.2 Construction Management

BBL will provide field staff working under the direction of a licensed Civil Engineer to oversee on-site activities and ensure that work is completed in accordance with contract documents and the work plan. The field staff will include a construction oversight manager (Oversight Manager) to oversee remedial construction activities conducted by the Contractor. The Oversight Manager will have previous experience managing the field operations of a remedial excavation project. BBL will also directly subcontract an environmental drilling company to conduct well abandonment and installation activities specified per the Trust SOPs described in this Work Plan in Section 3.3.1 and 3.3.2.

The Oversight Manager will verify that the Contractor executes all elements of the corrective action in accordance with Trust contract documents, this Work Plan and any other provisions specified in the Work Plan. The Oversight Manager will direct post excavation confirmation soil sampling required by this Work Plan and will be assisted by one or more personnel with environmental field sampling experience as work load and schedule dictate.

The Oversight Manager will be supported by an office-based Data Manager who will compile post-excavation confirmation sampling data and compare the results to soil cleanup criteria as described in Section 3.2.5. The Data Manager will prepare confirmation sampling data summaries and provide them to the Oversight Manager. The Oversight Manager will communicate these summaries to the Trust and decisions to terminate excavation activities or continue with over-excavation will be discussed during the regular Project Update Meeting discussed in Section 3.1.2.1. Requirements for over-excavation will be discussed in these meetings and over-excavation will be conducted as discussed in Section 3.2.5.

The Oversight Manager will communicate directly with the Contractor regarding the need for any additional over-excavation potentially needed based on the results of confirmation soil sampling and outcomes of decisions made in the Project Update Meetings. The Oversight Manager will maintain regular communication with the Trust Project Manager regarding the progress of the corrective action. The Oversight Manager will complete project documentation, at a minimum, as described in Section 3.4.

3.1.2.1 Project Update Meetings

The Trust will regularly communicate the progress of the corrective action activities and any post excavation confirmation results to the NPS and other stakeholders including the Water Board by holding weekly data review and update meetings to discuss excavation progress and confirmation sampling results. The agenda for these meetings will be provided to the stakeholders prior to the meeting. Specific protocols for resampling areas where over-excavation is required are provided in Section 3.2.5. The Oversight Manager will provide updates on the progress of the excavation activities by updating and distributing the Project Schedule for the Corrective Action described in Section 3.7.2, as necessary.

3.1.3 Construction Sequencing

Soil will be excavated in an area that receives some pedestrian traffic and is surrounded by regularly used roadways. Excavation, backfilling and restoration will be completed in phases to minimize impacts to the users of the area. Portions of active roadways will require temporary closure and/or traffic control during certain phases of the work. The Contractor will sequence all construction activities in a manner that will ensure that the corrective action is implemented in a safe, orderly and efficient manner and in accordance with this Work Plan. The Trust will provide traffic controls and signage as well as informational signage for the public describing activities at the Study Area. The planned work sequence and estimated schedule for major construction milestones are presented in Figure 3-6.

3.2 Excavation and Off-Site Disposal of Soil

This section presents implementation activities for soil excavation and off-site disposal for the following RUs for the Study Area:

- Shallow Soil Area 1;
- Shallow Soil Area 2;
- Shallow Soil Area 3;
- Deep Soil; and
- Telecommunications Corridor Soil.

As depicted on Figure 3-1, soil will be excavated to a depths ranging from three to 10 feet bgs for Shallow Soil Areas 1, 2, and 3. Deep soil will be excavated to approximately 22 feet bgs. Soil beneath the telecommunications conduit will be excavated to 16 feet bgs. A total volume of approximately 1,410 cubic yards of soil will be removed from the soil RUs based on the initial estimated geometry of the excavation boundaries as defined by existing in-situ characterization data. It should be noted that the final volume may vary based on the final horizontal and vertical dimensions of the excavation areas as determined by post-excavation confirmation sampling that will confirm if corrective action objectives have been met. The excavation confirmation sampling requirements are discussed further in Section 3.2.5.

Consistent procedures will be used for the implementation of excavation and off-site disposal activities for each of the soil RUs. Therefore, soil excavation activities will be addressed collectively for all soil excavation and off-site disposal corrective actions. Implementation activities for excavation and off-site disposal are discussed below including pre-excavation activities, excavation activities, waste classification sampling, off-site transportation and disposal, confirmation sampling, and backfilling and restoration activities.

3.2.1 Pre-Excavation Activities

The following provides a summary of pertinent pre-excavation activities to be performed to facilitate the safe and successful completion of the approved corrective actions. Initiation of these activities will, in most cases, not occur until written approval of this Work Plan is provided by the Water Board. However, procurement of certain permits identified in Section 3.2.2 may proceed in advance of formal approval.

3.2.1.1 Excavation Survey Control

A pre-excavation site topographic survey will be conducted by the Contractor using a California Licensed Land Surveyor. The Surveyor will base all site survey datum to an established USGS survey benchmark located near the Study Area; the location of which will be provided by the Trust. The site survey will include areas within 100 feet of the initial excavation extents. The pre-excavation survey will identify site features including but not limited to ground surface elevations, roads, paths, curbs, gutters, drainage features, hydrants, trees, and man hole covers. In addition, a field grid system will be established by the Oversight Manager to help locate key features of the Building 1349 Area. The grid system will be utilized to locate soil samples (as described in Section 3.2.5.2), final excavation limits and other pertinent features. Survey data will be collected at a frequency to ensure appropriate pre- and post-excavation survey resolution.

In addition, the surveyor will establish the initial limits of excavation shown on Figure 3-1. Horizontal spatial control and the locations of pertinent site features shown on Figure 3-1 (i.e. monitoring well and soil boring locations from previous investigations) is in North American Datum of 1927 (NAD27), California State Coordinate System, Zone 3. Coordinates of the initial excavation limits will be provided to the surveyor and the surveyor will mark these areas in the field with stakes and/or flags based on these coordinates. Location of the initial excavation extents will be verified by measuring key distances from known controls points such as monitoring wells, road intersections, etc.

Upon completion of the excavation, the Contractor will survey the horizontal locations and obtain elevations within the excavation. Upon completion of backfilling and site restoration, Contractor will resurvey the same area as the pre-construction survey to confirm final grade elevations.

In accordance with Presidio Trust Standard Operating Procedure No. 013 (SOP; Tetra Tech, 2001), locations, including monitoring wells, will be surveyed to within 0.1 foot relative to the North American Datum of 1927 (NAD27), California State Coordinate System, Zone 3. Elevations will be surveyed to within 0.01 foot relative to the 1907 Presidio Lower Low Water (PLLW) datum and relative to the North American Vertical Datum of 1988 (NAVD88). The results of the surveying will be presented in a corrective action implementation report as described in Section 3.7.3.

3.2.1.2 Work Zone Establishment

The majority of soils to be excavated are located in a Historic Forest Zone that contains an unpaved path for pedestrian use. Soils located in the Telecommunications Corridor RU are located adjacent to Washington Boulevard. To successfully complete corrective action objectives in this area, significant portions of Washington Boulevard will likely be disturbed.

Corrective action activities will utilize Washington Boulevard (including two-way traffic on a one-way section, discussed in Appendix A), Kobbe Avenue, Harrison Boulevard and Central Magazine Road. Appropriate vehicular and pedestrian traffic safety control measures, including the temporary closure of portions of Washington Boulevard, will be implemented during corrective action activities to divert traffic around active construction areas as described in detail in the Transportation and Traffic Control Plan (Appendix B). Flaggers, cones, signs, and barricades will be used, as needed, to warn of trucks entering and exiting the work areas and to direct pedestrian, bicycle and vehicular traffic away from moving equipment. It should be noted that access to the World War II Memorial parking lot at the corner of Washington Boulevard and Kobbe Avenue will be maintained throughout the duration of the project.

Proposed construction activities, including soil excavation haul routes and construction of temporary dry wheel wash facilities, may result in the disturbance of recently planted trees in the Study Area. To the extent practical, the trees will be protected in place. However, if construction activities will impact these trees, the Trust Natural Resources staff will temporarily relocate these trees until after construction activities are completed. The Contractor shall repair the impacted areas to make them suitable for re-planting of the trees.

Temporary site security fencing with windscreen will be installed around the entire perimeter of the corrective action area encompassing all RUs and a minimum amount of area immediately adjacent to the RUs to provide reasonable construction equipment access while minimizing impacts to public and natural resources to the extent practical (Figure 3-1). Temporary site security fencing will also be placed around the perimeter of the temporary soil stockpile area (Figure 3-1).

Signs will be developed and posted at the work area to explain the nature of the work and inform the public of potential presence of hazardous equipment and materials at the work area. The Trust will provide these informational signs. The Contractor will provide appropriate warning and other signs commonly used in conjunction with construction activities. Informational and construction warning signs will be posted on each side of the site security fencing as well as on the site security fencing surrounding the Building 1347 stockpile area.

3.2.1.3 Utility Survey and Clearance

Prior to the start of excavation activities, Underground Service Alert (USA) will be notified by the Contractor to locate utilities in the immediate vicinity of the proposed excavations. The Trust Utilities Department will review any available utility drawings that it may have to further identify potential unknown utilities in the excavation area. With exception of the telecommunication conduit which is addressed below, no underground utilities are known to exist in the excavation area. However, if underground utilities are identified, they will be protected in place by the Contractor during excavation.

3.2.1.4 Sediment and Storm Water Erosion Control

Because the expected excavation area is less than one acre (approximately 0.1 acre), the Trust will not be required to prepare a storm water pollution prevention plan (SWPPP) for the corrective action activities. However, the contractor will implement best management practices (BMPs) typically prescribed by a SWPPP during the project. BMPs will be implemented to minimize the sediment load of storm water run-off from active work areas onto undisturbed areas. This will include the installation of silt fencing inside the temporary site perimeter fence and placement of straw fiber rolls, straw waddles or gravel bags around existing catch basins, drains or storm water surface conduits (drain gutters). All straw fiber rolls or straw waddles used will be certified as weed and seed free. BMPs will be maintained at the Study Area through the rainy season in the work areas. In addition, the Contractor will use a street sweeper during excavation activities as necessary on roadways adjacent to the work area. The Contractor will store fuel and chemicals in such a manner as to prevent accidental spills from impacting storm water or surrounding ground surfaces. A temporary equipment fueling area consisting of fuel tank with secondary spill control structures will be located at the Central Magazine area on the east end of Central Magazine Road (Figure 3-1).

3.2.1.5 Temporary Soil Stockpile Area

Temporary soil stockpiling is planned for the Building 1347 parking lot area located north of the Building 1349 Study Area (Figure 3-1). An estimated area of 3,200 square feet will be required to stockpile soil to an approximate height of 10 feet. Stockpile soil will be placed on 10-mil HDPE polyethylene sheeting and covered by 10-mil polyethylene sheeting secured in place by sand bags or weights. The perimeter of the paved parking area will be surrounded on three sides with K-rail or similar barriers and the bottom layer of poly sheeting will be draped over the K-rails and secured to contain soils within the stockpile area and prevent or minimize storm water run-off. The fourth side of the stockpile area will be used as a daily access point and will use hay or straw bales in a similar manner as described above with the K-rails to contain the stockpile. The use of hay or straw bales will allow for easy access to the stockpile area during daily construction activities and can be easily secured during non-work hours. All hay or straw bales used will be certified as weed and seed free.

3.2.1.6 Equipment Decontamination Areas

The Contractor will establish decontamination areas in which dust, debris and soil will be removed from equipment prior to leaving the fenced excavation or stockpiling areas. Decontamination methods will likely consist of dry-decontamination techniques including brushing, sweeping and utilizing knock-off plates within or immediately adjacent to excavation areas to remove soil from equipment. Knock-off plates and other dry decontamination in the excavation areas will be located at the exit of the excavation area near the intersection of Harrison Boulevard and Hitchcock Street (Figure B1-2 in Appendix B). Off-haul truck tarping and decontamination will be conducted at the Building 1347 stockpile area and soils will be brushed, swept and otherwise contained at the stockpile area.

3.2.1.7 Personal Hygiene, Decontamination and First Aid Facility

The Contractor will supply and maintain a personal hygiene, decontamination and first aid facility at the construction area throughout the duration of the project.

3.2.1.8 Sanitary Facilities

The Contractor will provide and maintain portable sanitary facilities throughout the project. Sanitary waste will be removed and disposed of at an off-site facility in accordance with applicable laws and regulations.

3.2.1.9 Telecommunications Line Protection

It has been determined that the telecommunication line located at the Study Area cannot be temporarily re-routed or replaced. The lines will be protected in-place by the Contractor during soils excavation activities in this Telecommunications Corridor Soil Unit.

3.2.1.10 Establishing Dust Control Measures

The Contractor will establish an effective means of dust control to minimize the generation of dust associated with corrective action activities and the effects of ambient wind traversing excavated soil while conducting these activities. Dust control activities may involve the following:

- Construction vehicle speed at the work site must be limited to fifteen (15) miles per hour or less on unpaved access routes;
- Prior to any ground disturbance, water application to the area to be disturbed to prevent visible emissions from crossing the effective project boundary, as necessary;
- Areas to be graded or excavated must be kept adequately wetted to prevent visible emissions from crossing the effective project boundary;
- Soil stockpiles must be kept adequately wetted or covered when material is not being added to or removed from the pile;
- Equipment must be dry-decontaminated before moving from the project area onto a paved public road; and
- Visible track-out on the paved road must be cleaned using a street sweeper.

If visible dust is observed crossing the effective project boundary, immediate steps will be taken to eliminate it. These steps will include increasing the efforts of the dust suppressant activities mentioned above. If these activities do not eliminate visible dust from crossing the effective project boundary, soil moving activities will be halted until conditions change or until a plan for further dust suppression measures is developed. Further description of the dust control measures are discussed in Appendix A.

3.2.1.11 Sensitive Habitat and Species Surveys

The Trust will coordinate surveys of sensitive habitats and species prior to implementation of corrective action activities and identify corrective measures to protect and preserve these resources. Applicable actions are discussed further in Section 3.2.2. The Trust Natural Resources staff is currently conducting sensitive plant species surveys. Sensitive species that are identified have been or will be relocated outside of the work area.

3.2.2 Permitting Requirements

The Contractor will procure a Trust Excavation Permit (Excavation Permit). The Excavation Permit Application will be made through the Trust and Trust specialists in environmental, archeological, utility and vegetation management concerns who will review the application and provide comment and provisions for approval based on applicable Trust guidelines. The Excavation Permit will also address policy and procedures specific to management of LTTD soils as discussed further in Section 3.6.

During implementation of corrective action activities, the Trust will comply with applicable provisions of the Archeological and Historic Preservation Act (AHPA) and the Native American Graves Protection and Repatriation Act (NAGPRA) if such resources are encountered. Federal and State Endangered Species Acts (ESA and CESA) and the Migratory Bird Treaty Act (MBTA) will also be followed during implementation of the corrective action to protect natural resources found on the Presidio. The Trust will perform wildlife nest surveys within 24 hours of the start of corrective action activities at the project area. The surveys will be used to identify measures that will be required to protect nesting birds or other sensitive species that are identified in the area. These measures may include the rescheduling of excavation activities to non-nesting time periods. It

should be noted that if corrective active activities occur outside of the prescribed nesting seasons, no surveys will be required.

Since the Study Area is within Area B of the Presidio, the corrective action will be completed in a manner consistent with land uses established by the PTMP. NPS Management Policies and the Presidio Trust Vegetation Management Plan (VMP) apply to implementation of corrective actions (Trust and NPS, 2001). Prior to corrective action activities commencing, native plant specialist from the Presidio will be consulted by the Trust to identify any sensitive plant species that may be present in the work area. The Plant Specialists will develop procedures for preventing damage to sensitive plant species during work activities and may implement temporary or permanent sensitive plant relocation as described in Section 3.2.1.11. The Trust will implement any recommended controls identified by the Plant Specialists prior to excavation activities occurring.

As described in the Basin Plan – Chapter 4 of the Porter-Cologne Water Quality Control Act promulgated under California Water Code §13240-13241, stormwater discharges are regulated by the Water Board for certain municipal, industrial, and construction stormwater discharges through National Pollution Discharge Elimination System (NPDES) permits. During proposed soil excavation activities, approximately 0.10 acres of soil will be disturbed to implement the proposed corrective action. Therefore, a NPDES permit will not be required for excavation activities at the Study Area.

Due to the presence of naturally-occurring asbestos (NOA) in areas of serpentinite rocks and soil, best available dust control measures will be employed to reduce and control dust emission from construction activities to satisfy Asbestos Airborne Toxic Control Measure (ATCM) requirements for Construction and Grading Operations in accordance with Section 93105 (e) 1 (A-F) of the California Code of Regulations (CCR). Because the anticipated disturbed excavation area is less than one acre, an Asbestos Dust Mitigation Plan and Application for construction and excavation activities will not be required to be submitted to the Bay Area Air Quality Management District (BAAQMD) Section 93105 (e) 2 (A-B). Best available dust control measures for construction activities at the Study Area as described in Section 3.2.1 satisfies the requirements of Section 93105 (e) 1 (A-F).

3.2.3 Excavation Activities

Excavation activities will likely be performed using a hydraulic excavator. Excavated soil will be loaded on appropriate soil hauling trucks and will be temporarily stockpiled in the paved parking area on the south side of Building 1347 to the north of the Study Area off of Kobbe Road. It is anticipated that soil hauling truck routes will be limited to a relatively narrow corridor adjacent to Shallow Soil RU Areas #1 and #2 and the Deep Soil RU to allow ingress and egress effectively while minimizing disturbances to non-excavation areas to the extent practical (as shown on Figure B1-2 of Appendix B). It is expected that the ingress/egress point for these areas will be near the intersection of Harrison Boulevard and Hitchcock Street, allowing trucks to have reasonable access to the Building 1347 stockpile area. It is anticipated that excavated soils from Shallow Soil RU #3 and the Telecommunications Conduit RU may be directly loaded onto haul trucks staged on the adjacent Washington Boulevard. Trucks may then proceed to the Building 1347 stockpile area via Washington Boulevard and Kobbe Avenue as described in Appendix B. Newly placed stockpile material may be sufficiently wetted for dust control prior to covering with plastic sheeting.

Excavation of the Deep Soil RU will be conducted such that the Shallow Soil RU Area #1 is protected from spillage of excavated deep soil. Plastic sheeting, or other effective measures, will be employed.

Asphalt on Washington Boulevard will be saw-cut to facilitate the effective resurfacing after completion of excavation and backfill. Clean asphalt may be directly loaded onto off-haul trucks for transport to an asphalt recycling facility.

It should be noted that proposed horizontal and vertical extent of areas of excavation are based on the assumption that native geologic materials are amenable to traditional excavation techniques as described above. However, many of the proposed excavation areas will be advanced into the weathered Franciscan Formation bedrock found throughout the Study Area. Based on the apparent relative competency of the bedrock in any given area, it may be found that excavations to total proposed depths may be technically impractical. In that case, materials with concentrations of COC above the applicable cleanup levels may be left in place. Material left in place above cleanup levels will be addressed with Land Use Controls (LUCs) as described in Section 3.4.

The sidewalls of all excavations will be sloped or benched per *Title 8 California Code of Regulations* (CCR), Section 5192 to protect workers health and safety and adjacent structures. The structural integrity of the excavation sidewalls in weathered bedrock may effectively support slopes greater than standard 2:1. A contracted geotechnical engineer may be called on to evaluate excavation slope conditions and verify if greater than a 2:1 slopes may be maintained. These conditions will be evaluated particularly on the western side of the Telecommunications Conduit RU in an effort to meet corrective action objectives in that area while avoiding the necessity to abandon and replace monitoring well 1349MW100. In an effort to minimize construction downtime, excavation activities will begin with the Telecommunications Corridor Soil RU. If conditions dictate that 1349MW100 be abandoned to facilitate achievement of corrective action goals, work can proceed to another soil RU while abandonment activities are being conducted.

3.2.4 Transportation and Disposal

Prior to off-site disposal of excavated soil, waste classification sampling will be conducted to evaluate waste disposal options. Based on analytical results of waste classification sampling, the estimated 2,115 tons of soil (1,410 in-place cubic yards) will be disposed of at the appropriate approved hazardous or non-hazardous waste disposal facility. Representative composite waste classification samples will be collected from excavated soil stockpiles. Sampling procedures are detailed in Section 3.2.4.1, below. Waste classification sampling results as well as relevant existing in-situ analytical data will be provided to an appropriate Trust-approved waste disposal facility and an appropriate waste profile will be developed for that material.

Excavated and stockpiled material that has been accepted for disposal at an appropriate permitted facility approved by the Trust will be loaded to trucks, transported to a permitted facility, and disposed in accordance with the Transportation and Traffic Control Plan (Appendix B) and in accordance with the pertinent sections of Title 27 of the California Code of Regulations. All waste materials will be transported and disposed of in accordance with applicable laws and regulations. The quantity of impacted soil will be documented in the field, and tonnage will be confirmed with truck weight tickets. Field documentation of approximate volumes will be on a per truck basis with assumption of standard volume of given truck (i.e. approximately 18 cubic yards for standard end-dump trucks). Actual tonnage of disposed materials will be that provided at the certified disposal facility's weight station and actual volumes of soil removed will be documented based on pre- and post-excavation surveys. Wastes will be shipped and documented with appropriate waste manifests or bills of lading.

As described in Appendix B Figure 1-2, off-haul trucks will access the Building 1349 Area by traveling west on Kobbe Avenue from three different routes depending on whether the trucks will be arriving from California Highway 1 (CA 1) south, US Highway 101 (US 101) north or south. After arriving at the Building 1349 Area, trucks will proceed south on Harrison Boulevard towards the intersection of Washington Boulevard and Central

Magazine Road. Trucks will be staged on Central Magazine Road (a Trust-controlled dead-end street) either by backing onto Central Magazine Road or turning and backing off of the entrance to Hunter Road on the southwest end of Central Magazine Road. Trucks may then proceed to the Building 1347 stockpile area by pulling directly onto Harrison Boulevard and proceeding north to Building 1347. If no trucks are waiting for staging on Central Magazine Road, trucks may proceed directly to the Building 1347 stockpile area. The Contractor will be responsible for controlling the dispatch of off-haul trucks to minimize the number of waiting trucks at the work area to the extent practical. After being loaded, dry decontaminated and tarped, trucks may proceed west on Kobbe Avenue to Washington Boulevard and exit the Presidio on CA 1 or US 101, as shown in Appendix B.

Based on the anticipated volume of soils to be excavated and disposed off-site, likely less than 100 truck loads of soil will be hauled from the Study Area. Given the anticipated staging, no more than 30 truck loads of soil will be transported from the Study Area on any given day. Regardless, truck loads leaving the Study Area will be limited to less than 30 per day.

3.2.4.1 Waste Classification Sampling

Waste classification will be conducted in accordance with waste hauler, waste handling facility, and state/federal requirements. One composite waste classification sample will be collected for every 500 cubic yards of the stockpiled soil. The composite sample will be comprised of four discrete grab samples of representative material from each 500 cubic yards of stockpiled soil in accordance with Presidio Trust Standard Operating Procedure No. 012 (SOP; Tetra Tech, 2001). The four discrete grab samples will be sent to an appropriate analytical laboratory under the protocol described in Section 3.2.5.3, including sample identification convention. The Chain of Custody (COC) will direct the laboratory to appropriately combine the four grab samples into one representative composite sample for analysis. It is anticipated that a minimum of three composite samples will be needed to adequately characterize excavated soils for disposal. Samples will be analyzed for waste classification as described below.

In general, Resource Conservation Recovery Act (RCRA) hazardous wastes are solid wastes demonstrated by a Toxicity Characteristic Leaching Procedure (TCLP) test or to contain levels of certain toxic compounds above specific federally regulated thresholds. If the one or more of 39 toxic compounds listed in Table I of 40 CFR 261.24 are detected in soil samples at levels above the maximum unregulated concentrations, the waste must be characterized as a toxic hazardous waste (RCRA hazardous). Table 3-2 provides a summary of TCLP threshold limit concentrations for anticipated compounds at the Building 1349 Study Area. In general, California hazardous wastes are solid wastes demonstrated by a Soluble Threshold Limit Concentration (STLC) and Total Threshold Limit Concentration (TTLC) tests or to contain levels of certain toxic compounds above specific federally regulated thresholds. If one or more of the 38 toxic compounds listed in 22 CCR 66261.24 are detected in the sample at levels above the maximum unregulated concentrations, the waste must be characterized as a toxic hazardous waste (California hazardous).

Waste classification samples will be analyzed for the total concentration of COC for the Study Area. Additional samples may be collected and analyzed by the laboratory on a contingency basis. Typical analytical methods are described below:

- TPHg, TPHd, and TPHfo by United States Environmental Protection Agency (USEPA) Method 8015 Modified;
- 17 California Assessment Manual (CAM 17) metals by USEPA Method 6010B;
- Volatile organic compounds (VOCs) by USEPA Method 8260B;

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- PAHs by USEPA Method 8270C; and
 - OCP by USEPA Method 8081A.

Analytical results will be compared to the criteria in the Threshold Limit Concentrations in Table 3-2.

1. If the total concentration of a compound exceeds the TTLC, the material must be disposed of as a California hazardous waste.
2. If the total concentration of a compound exceeds 10 times the STLC, the STLC analysis will be performed. If the STLC concentration of a compound exceeds the STLC, the material must be disposed of as a California hazardous waste.
3. If the total concentration of a compound exceeds 20 times the TCLP threshold, TCLP analyses will be performed. If the TCLP concentration of a compound exceeds the TCLP threshold concentration, the material must be disposed of as a RCRA hazardous waste.

All hazardous waste will be containerized, manifested, and transported by a California-licensed waste hauler to a permitted treatment, storage, or disposal facility within 90 days of waste generation.

Soil with concentrations less than the applicable threshold criteria will be managed as non-hazardous waste. In accordance with the California Health and Safety Code (Section 25157.8), soil with total concentrations of lead greater than 350 mg/kg will be disposed of at a Class I landfill or approved waste disposal facility.

3.2.5 Confirmation Sampling Requirements

Following completion of excavation activities for a particular RU or portion of an RU, sidewall and bottom confirmation soil samples will be collected by the Oversight Manager to verify soil with concentrations of COC above the cleanup levels has been removed. The number of sidewall and bottom confirmation samples will be based on the physical dimension of each area of excavation. Sidewall and bottom confirmation samples will be collected from each RU as described below. It is anticipated that excavation work will be sequenced by the Contractor with input from the Oversight Manager to facilitate regular confirmation sampling activities so that excavation work may proceed without as much interruption as practical while waiting for confirmation sampling results. For example, it may be most practical to begin excavation activities at Shallow Soil RU #2 and complete confirmation sampling before starting a larger area such as Shallow Soil RU #1 and the Deep Soil RU. By proceeding in this manner, results will be available for one area while still performing activities in another. As a result, any over-excavation work that might be required may be effectively sequenced to avoid delays as much as possible.

Analytical results for sidewall and bottom samples will be compared to the applicable soil cleanup levels for soil excavations within the Study Area. Table 1-3 presents the soil cleanup criteria to be used for each depth interval (0 to 3 feet bgs, 3 to 10 feet bgs, greater than 10 feet bgs and greater than 5 feet to groundwater, and greater than 10 feet bgs and less than 5 feet to groundwater). If concentrations of COC are below cleanup levels, the excavation activities will be terminated. If one or more COC is detected above soil cleanup level(s), a collaborative effort between the Trust, NPS and the stakeholders will be used to determine how much over-excavation will be completed in the area of the exceedance of the cleanup level. The size of the over-excavation will be based on professional judgement which will consider the types of contaminant, the magnitude of the exceedance in relation to the cleanup level, and relevant field observations (e.g., visual contamination, odors, etc.) specific to the type of COC.

Over-excavations will be advanced vertically and/or laterally in a minimum of one foot increments. The Trust will consult the NPS and stakeholders in a collaborative effort regarding over-excavation decisions during the weekly project update meetings described in Section 3.1.2.1.

Confirmation soil samples will be collected from any over-excavation areas at the same frequency as the confirmation soil samples that were collected from the initial excavation. At a minimum, one bottom and three sidewall samples will be collected from the over-excavation. Soil samples from the over-excavation area will be analyzed for the COC suite associated with the chemical(s) that exceeded the cleanup levels in the initial confirmation sample.

Although it is anticipated that confirmation soil sampling will show that cleanup objectives will be met for COCs related to former petroleum hydrocarbon impacts at the Study Area, it has been documented in the Final CAP (BBL, 2006) that elevated concentrations of two metals, arsenic and vanadium, may not be related to former operations at that Study Area and are believed to be representative of naturally-occurring background conditions in serpentinite-containing soils as described in Section 2.5.1 of the final CAP (BBL, 2006). In the event that after one round of over-excavation and confirmation sampling in areas driven solely by arsenic or vanadium cleanup level exceedences, a statistical evaluation will be used to determine if arsenic or vanadium exceedences are representative of background conditions in serpentite soils. A 95% upper confidence limit on the arithmetic mean (95% UCL) for Study Area arsenic or vanadium results, including confirmation results, will be used to determine if the 95% UCL is below the cleanup levels for arsenic (5.4 mg/kg) or vanadium (74 mg/kg). Those results that are from historical or confirmation samples that have subsequently been removed by the corrective action (i.e. those arsenic and vanadium sample results that are co-located with other COCs that exceeded their cleanup objective) will not be used in the 95% UCL calculations. If the 95% UCL of the remaining arsenic and vanadium samples shows that either arsenic or vanadium is below these cleanup levels, this data will be presented to the Trust, NPS, Water Board and other stakeholders at the weekly progress meeting and a determination between the group will be made in regards to whether further over-excavation is warranted.

Excavation and confirmation sampling will be repeated until the confirmation soil samples from the sidewall and base of the excavation report concentrations of COC(s) below the soil cleanup criteria or the Water Board concurs that the soil RU no longer poses a risk to human health or the environment. If cleanup levels cannot be achieved due to technical considerations (such as the inability to effectively excavate weathered bedrock), the soil removal program will be terminated and LUC(s) will be adopted in accordance with Section 3.4, as necessary.

3.2.5.1 Sidewall Confirmation Sampling

Each sidewall will be sampled every 50 feet of its lateral extent. At a minimum, one sidewall sample for each excavation sidewall will be collected (assuming four sidewalls per excavation). Although actual sampling locations will be biased to areas of visual staining or odors, based on professional judgment, the initial vertical depth intervals targeted for sidewall sampling were evaluated and selected for each soil RU, as follows:

- Shallow Soil RUs – Areas 1, 2, and 3: For every 50 feet of sidewall, the following samples will be collected from shallow soil RUs:
 - One sample collected at a depth of 1.5 feet bgs at midpoint of the 0 to 3 feet bgs interval;

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- One sample collected at a depth of 4.5 feet bgs for excavations with a maximum depth of 8 feet bgs;
 - Two samples collected at a depths of 4.5 feet and 7.5 feet bgs for excavations with a maximum depth of 10 feet bgs; and
 - Three samples collected at depths of 4.5 feet, 7.5 feet, and 12.5 feet bgs for excavations with a maximum depth of 15 feet bgs.

Figure 3-2 presents proposed sidewall sample locations for shallow soil excavations. If excavations extend beyond 15 feet in total depth, sidewall samples will be collected at the midpoint of each five-foot depth interval from 10 feet bgs to total depth.

- Deep Soil RU: For every 50 feet of sidewall, the following sample will be collected:
 - One sample will be collected at the midpoint of each 10-foot depth interval from 10 feet bgs to total depth.

Since the Deep Soil RU is located within Shallow Soil RU Area 1, the top of the excavation is anticipated to start at approximately 10 feet bgs. Therefore, sidewall samples for the Deep Soil RU will be limited to depth intervals greater than 10 feet bgs. Sidewall samples for Shallow Soil RU Area 1 will be collected as described above.

- Telecommunications Corridor RU: For every 50 feet of sidewall, the following samples will be collected for the telecommunications corridor:
 - One sample collected at a depth of 1.5 feet bgs at midpoint of the 0 to 3 feet bgs interval;
 - One sample collected at a depth of 4.5 feet bgs for excavations with a maximum depth of 8 feet bgs;
 - Two samples collected at a depths of 4.5 feet and 7.5 feet bgs for excavations with a maximum depth of 10 feet bgs; and
 - Three samples collected at depths of 4.5 feet, 7.5 feet, and 12.5 feet bgs for excavations with a maximum depth of 15 feet bgs.

Figure 3-2 presents proposed sidewall sample locations for the telecommunications corridor soil excavation.

Additional sidewall samples may be collected based on field observations including visual staining or odors. Confirmation soil samples for the areas of excavation within the Study Area will be analyzed for the following:

- PAHs by (USEPA) Method 8270SIM;
- TPHg, TPHd and/or TPHfo by USEPA Method 8015 modified and USEPA Method 3630A - Silica Gel Cleanup;
- OCPs by USEPA Method 8081A; and
- Metals by USEPA Method 6000/7000 series.

3.2.5.2 Bottom Confirmation Sampling Requirements

A 25-foot by 25-foot sampling grid will be established for each area of excavation by the Oversight Manager in conjunction with the Contractor-contracted professional land surveyor. Control points for the grid will be established in the field using existing features that will not be disturbed by the corrective action activities (i.e. monitoring wells, certain trees, road intersections or other control points) to verify initial excavation extent limits shown on Figure 3-1. One bottom soil confirmation sample will be collected at the center of each grid with a minimum of one bottom sample per area of excavation or 625 square feet. Actual sampling locations will be biased to areas of visual staining or odors, based on professional judgment. Figure 3-3 presents proposed bottom confirmation sample locations for areas of excavation.

Additional sidewall samples may be collected based on field observations including visual staining or odors. Bottom confirmation soil samples for the areas of excavation will also be analyzed for the following:

- PAHs by (USEPA) Method 8270SIM;
- TPHg, TPHd and/or TPHfo by USEPA Method 8015 modified and USEPA Method 3630A - Silica Gel Cleanup;
- OCPs by USEPA Method 8081A; and
- Metals by USEPA Method 6000/7000 series.

3.2.5.3 Confirmation Sampling Methods

Confirmation soil samples will be collected in accordance with the Presidio Trust Standard Operating Procedure No. 001 (SOP; Tetra Tech, 2001). Soil samples will be collected in clean brass, stainless steel or butyrate sleeves, covered with Teflon® sheets and plastic end caps and labeled. Liners will be driven into the sidewall or base of each excavation. For excavations that cannot be entered due to health and safety considerations, liners will be driven into soils in an excavator bucket containing material from the targeted sampling location. Samples will be labeled with unique sample identifications that incorporate the following as well as sample date, time and field samplers initials:

- The Site (1349);
- Sample Type (EX = excavation, SC=stockpile composite, etc.);
- Sequence number for confirmation samples (101, 102, ...); and
- Sampling depth interval (i.e. 1.5 feet).

For example, the second excavation confirmation sample from the Building 1349 Study Area collected at 1.5 feet bgs would be labeled as 1349EX102(1.5). In the case of a composite stockpile soil sample for waste characterization, the sample would be identified as 1349SC01, 1349SC02, etc. The Oversight Manager will contact the Trust Environmental Database Manager prior to the initiation of field activities to confirm that the sample identifications utilized for this corrective action are unique.

Quality Assurance/Quality Control (QA/QC) samples will be collected per QAPP protocol as follows:

Equipment Rinse Samples – Rinse blanks will be collected daily by pouring distilled water over sampling equipment used. The equipment rinse blank identification will be developed by referring to

sample identification number of the sample collected prior to the rinse blank, adding the identifier “RB” and a shortened identification of the sample collected after the blank. For example, a rinsate blank collected after 1349EX102 and before 1349EX103 would be 1349EX102RB03.

Field Duplicate Samples – Field duplicates will be collected at a frequency of one per 10 samples of the sample matrix. Field duplicate samples will be labeled DUP plus the date of the sample (i.e. DUP050306 would represent a duplicate sample collected on May 3, 2006). If more than one field duplicate is collected per day, a suffix (i.e. -01 or -02) will be added. The primary sample that the duplicate is related to will be clearly indicated in the field notes.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples – MS/MSD samples will be identified using the primary field sample identification plus “MS” or “MSD” as a suffix (i.e. 1349EX102(1.5)MS or 1349EX102(1.5)MSD). One MS/MSD sample will be collected per 20 samples of the same sampling matrix.

Sample collection will be documented in the field book along with a sketch of the excavation and sample collection location as well as any relevant QA/QC samples. All samples will be sealed in plastic bags and placed on an ice-cooled cooler at 4 degrees Celsius (+/- 2 degrees C) for eventual shipment to an analytical laboratory. A chain of custody record (COCR) will be filled out and maintained for all samples. The COCR will include the following:

- Project name and number;
- Name and signature of the sampler;
- Destination of samples (laboratory name);
- Sample identification (described above);
- Sample location, description and depth (as applicable);
- Date and time of collection;
- Number and type of containers;
- Analysis requested;
- Preservatives used (if applicable);
- Field or laboratory filtering (if applicable);
- Signatures, time and date of persons involved with custody transfer;
- Laboratory purchase order;
- Airbill number (if applicable);
- Relevant remarks to sample analysis (i.e. selected QA/QC samples).

Unused lines of the COCR will be crossed out and initialed. COCRs will be maintained with the sample coolers and taped to the inside lid of the cooler when shipped to the laboratory. Custody seals will be signed and dated and taped to outside of each cooler in a manner that the seal must be broken to access the samples inside. Copies of the COCR will be retained and filed by the Oversight Manager before the samples are shipped. A copy of the COCR will be delivered to the Trust project manager as soon as practical. Multiple coolers with samples may be shipped at once and a COCR for the samples contained in each cooler will be placed in that cooler. The outside of the coolers will be marked with the total number of coolers in the delivery group.

The laboratory will provide both conventional hard copy data reports as well as electronic data deliverables (EDDs) that will be validated and imported into the Presidio database. The EDDs and hard copy reports will be subjected to QA/QC to assure accuracy of reports. For each sampling event, Data Val will independently review laboratory data and provide a Quality Control Summary Report which will be added to the Presidio database. Results of the soil sampling will be presented in the Corrective Action Completion Report.

3.2.5.4 Confirmation Sampling Documentation

Confirmation sample locations will be marked and labeled in the field with stakes or flags to identify the sample number and location. Bottom sample locations will be controlled by the 25 ft x 25 ft grid described above and pre-surveyed in the field. Confirmation sample locations will be sketched in field notes, with distances from known points to allow re-location. Confirmation sample locations that meet corrective action objectives will be surveyed along with the limits of the excavation.

For all samples collected at the Building 1349 excavation area, sample tracking documents will be prepared so that COCRs can be maintained and continuing sample disposition may be tracked and controlled. Forms and labels will be filled out with indelible ink. Field sampling identification documents will include a daily field activity log, sample label and COCRs. The Oversight Manager direct the field sampling staff to prepare these records during each sampling activity for the various RUs and will provide quality review for accuracy.

3.2.6 Backfilling and Restoration

Once soil removal activities are completed for areas of excavation based on meeting corrective action objectives, excavations will be backfilled using certified-clean imported fill. Prior to starting corrective action activities, the Contractor will provide the Oversight Manager with a proposed source(s) for backfill material. The Oversight Manager will inspect the source(s) and verify or obtain samples of the material documenting its chemical composition to determine its suitability for backfilling at the Building 1349 Area. Sample collection and QA/QC procedures, as necessary, will be in accordance with the QAPP. Potential fill material stockpiles will be sampled at each fill source at a frequency consistent with Department of Toxic Substances (DTSC) Guidance (DTSC, 2001). The amount of fill needed is estimated at over 1,000 cubic yards but less than 5,000 cubic yards. Therefore, DTSC guidance states that four representative composite samples will be collected for the first 1,000 cubic yards (i.e. one composite per 250 cubic yards) plus one additional sample per each additional 500 cubic yards. Samples will be analyzed for VOCs (USEPA Method 8260B), SVOCs (USEPA Method 8270C), TPHg/d/mo (USEPA Method 8015B modified/EPA Method 3630A, pesticides (USEPA Method 8081A and 8141A), herbicides (USEPA 8151A) and Title 22 metals (USEPA Method 6000/7000 series). Chemical concentrations detected in samples of potential imported fill will be compared to cleanup goals and the requirements for backfill material specified in Water Board Order No. R2-2003-0080 (Water Board, 2003a) and the EKI Cleanup Levels Document (EKI, 2002).

To support the adjacent roadway, a certified-clean structural material will be used to backfill the telecommunications corridor excavation. If necessary, a filter fabric will be installed at the base of the excavations to stabilize the subgrade during backfilling activities.

Backfill will be compacted in a maximum of ten-inch lifts from the base of the excavation to existing ground surface. Soil compaction will be achieved using a compaction wheel on an excavator or backhoe. Backfill will be compacted to no more than 85% percent relative compaction in natural areas and will be coordinated with the Trust's vegetation restoration specialists. Structural backfill placed in the telecommunications corridor will be compacted to 90 percent relative compaction to three feet below pavement subgrade elevation and 95 percent relative compaction to support the adjacent and overlying roadway. Compaction will be determined on the relative percent of the maximum dry density as described by ASTM D 1557. Compaction measurements per ASTM D 1557 will be conducted by the Oversight Manager or a geotechnical engineer subcontracted to the Oversight Manager. The Oversight Manager will observe placement and compaction of the backfill material and perform or direct density tests at representative locations to confirm that adequate compaction is obtained.

With the exception of repairs to Washington Boulevard to pre-construction conditions, the Trust will perform revegetation activities at the Building 1349 Area. Thinning of the historic forest has been initiated in the vicinity of the Building 1349 Area and replanting of approved tree species has been completed in some areas outside of the proposed soil excavation areas. These activities will continue throughout the entire Building 1349 Area upon completion of backfilling of excavations. The Trust will ensure that revegetation of trees will be consistent with the VMP (Trust and NPS, 2001) including the use of approved and prescribed species of plants for the Historic Forest Zone. No planted understory ground cover including grasses or shrubs is specified at this time. Until vegetation has been adequately re-established to provide natural storm water and sediment run-off control, storm water and erosion BMPs such as those described in Section 3.2.1.4 will be maintained and monitored by the Trust. Inspection and monitoring of these measures will be conducted on a regular basis and documented with inspection record/corrective action measure field logs. It is expected that these BMPs will remain in place through the end of the 2007 rainy season and will be evaluated for removal based on the amount of re-vegetation that occurs at that time.

3.2.7 Groundwater Dewatering Activities

The deepest area of excavation in the Deep Soil RU is approximately 12 feet above groundwater; however, groundwater dewatering activities may be necessary if additional excavation is required in the Deep Soil RU. If groundwater infiltrates an area of excavation, groundwater dewatering activities will be implemented to remove water from the area of excavation. An area of depression will be excavated to create a preferential low point within the excavation. Water will be evacuated from the area of depression using a trash pump with a maximum capacity of 25 gpm.

Based actual observed field conditions, evacuated water may be containerized in a Baker tank that can be placed on Washington Boulevard within the area that will be temporarily closed to traffic if the volume of water required for removal warrants. If the volume of water indicates that a Baker tank is not required, water can be pumped into a 200-500 gallon truck mounted poly tank and transported to a temporary equivalent-sized holding tank located in the Central Magazine where current Presidio-wide quarterly groundwater purge water is stored and managed. Waters will be managed for disposal consistent with the procedures used for quarterly groundwater purge water disposal.

3.2.8 Project Health and Safety

BBL will prepare a Site-specific Health and Safety Plan (HASP) for use by its employees and subcontractors (drillers). The HASP will comply with applicable California Occupational Safety and Health Administration (Cal/OSHA) regulations, Occupational Safety and Health Administration (OSHA) regulations, United States Environmental Protection Agency (USEPA) regulations, and BBL health and safety policies and procedures. This plan follows the guidelines established in the following:

- *Standard Operating Safety Guides*, USEPA (Publication 9285.1-03, June 1992).
- *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, NIOSH, OSHA, USCG, USEPA (86116, October 1985).
- *Title 8 California Code of Regulations (CCR)*, Section 5192.
- *Title 29 of the Code of Federal Regulations (CFR)*, Part 1910.

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- *Title 29 of the code of Federal Regulations (CFR), Part 1926.*
 - *Pocket Guide to Chemical Hazards, DHHS, PHS, CDC, NIOSH (2003).*
 - *Threshold Limit Values, ACGIH (2005).*
 - *Guide to Occupational Exposure Values, ACGIH (2005).*
 - *Quick Selection Guide to Chemical Protective Clothing, Forsberg, K. and S.Z. Mansdorf, 2nd Ed. (1993).*
 - *Health and Safety Policies and Procedures Manual, Blasland, Bouck & Lee, Inc.*

The HASP will include the following:

- A description of activities and potential hazards as described in this Work Plan;
- The level of personal protection that will be used during sampling activities;
- Definition of exclusion, contaminant reduction and support zones; and
- Required personal protective measures, including work zone air monitoring.

The Contractor will be responsible for the health and safety of their employees and/or subcontractors. The Contractor will prepare and implement a HASP for Contractor activities. Copies of the BBL and Contractor HASPs will be available on-site at all times. All visitors to the Study Area will familiarize themselves with these HASPs and sign in and out when entering or leaving the Study Area. The daily sign in/sign out log will be kept at site by the Contractor.

Monitoring of atmospheric conditions including dust levels and organic vapors will be addressed in the HASPs. The Contractor will be responsible for minimizing and controlling dust levels at the Study Area. The Oversight Manager will visually monitor dust levels and measure dust levels with instrumentation as described in Appendix A.

3.3 Groundwater Monitoring Plan

Groundwater monitoring will be conducted to evaluate the stability or improvement of groundwater quality at monitoring well 1349MW100. The groundwater monitoring program will consist of water-level-elevation monitoring, sample collection, and chemical analysis of samples. Water-level-elevation data will be used to confirm groundwater flow direction and calculate site-specific horizontal gradients in the aquifer. Additionally, groundwater analytical results will be used to verify groundwater impacts are limited to the immediate vicinity of monitoring well 1349MW100.

Based on the analytical results of previous groundwater investigations conducted at the Site, groundwater samples will be collected from the monitoring well network. Groundwater samples and water level measurements will be collected from the following monitoring wells:

- Existing Monitoring Wells: 1349MW01, 1349MW02, 1349MW03R, 1349MW100/1349MW100R (if 1349MW100 is required to be abandoned), 1349MW101, 1349MW102, 1349MW103/1349MW103R, 1349MW104, and 1349MW105; and

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- Additional Monitoring Wells: 1349MW106 and 1349MW107.

Figure 3-4 presents the locations of monitoring wells included in the groundwater monitoring program.

Groundwater monitoring will be conducted for a maximum period of five years and will be conducted as part of Trust's on-going Presidio-wide quarterly groundwater monitoring program. Sampling will be conducted by the Trust's quarterly groundwater sampling contractor. Groundwater samples will be analyzed quarterly for a minimum of one year for COCs (Section 3.3.4 presents groundwater sampling). If all constituents within an analytical suite are detected at concentrations below cleanup levels for four consecutive quarterly sampling events, then the frequency of monitoring for the analytical suite will be reduced to a semi-annual basis (Table 1-3 presents groundwater cleanup levels). If after an additional year of semi-annual sampling, all constituents within the analytical suite are detected at concentrations below cleanup levels, the analytical suite will no longer be analyzed in groundwater samples. If all analytical suites and groundwater wells meet these criteria within a 5-year monitoring period, the groundwater monitoring program will be discontinued and the wells will be considered for abandonment at that time. The results of groundwater monitoring activities will be documented as part of the on-going Presidio-wide Semiannual Groundwater Monitoring Reports. However, the first quarter of groundwater monitoring data will also be presented in the Corrective Action Implementation Report (Section 3.7.3).

In accordance with Task 13 of Water Board Order R2-2003-0080, a Five-Year Status Report will be prepared to evaluate the effectiveness of the selected corrective action for groundwater and submitted to the Water Board for approval. In the Five-Year Status Report, groundwater conditions will be evaluated within the Study Area and future corrective actions will be assessed based on the following general criteria:

- If cleanup levels for all analyzed constituents are achieved within the five-year monitoring period as described above, the groundwater monitoring program will be discontinued;
- If it is demonstrated that concentration(s) of COC are decreasing toward cleanup levels (i.e., showing a consistent decreasing trend) within a reasonable time period, the groundwater monitoring program will either be discontinued or continued for a specified time period to confirm attainment of cleanup levels, as appropriate;
- If concentration(s) of COC are above cleanup levels but have remained generally stable (i.e., no increasing trend) and the groundwater impacts are shown to be localized around well 1349MW100, restrictions on groundwater use in the area may be implemented, as appropriate, based on an updated evaluation of performance data, cost-effectiveness, current remedial technologies, probability of potential groundwater development, etc. as required by Task 13 of the Order; and
- If concentration(s) of COC are above cleanup levels and generally not stable (i.e., increasing trend) or a larger groundwater plume (beyond the general vicinity of well 1349MW100) is identified, an alternative cleanup strategy for the Groundwater RU will be evaluated.

The Five-Year Status Report will also evaluate current geochemical conditions and trends to assess if metals concentrations above cleanup levels in groundwater can remain with no further action. In addition, the evaluation of analytical results for dissolved metals as well as general chemistry parameters will help determine if observed existing natural degradation processes continue to occur over time which will further demonstrate the effectiveness of the preferred alternative.

3.3.1 Monitoring Well Abandonment

Due to the location of monitoring well 1349MW103 in an area of excavation, this monitoring will be removed. Monitoring well 1349MW103 will be sampled prior to the start of excavation activities. Following soil excavation and restoration activities, replacement monitoring well 1349MW103R will be installed at its original location. Monitoring 1349MW103R will be sampled following installation. As described previously, it may not be practical to preserve the integrity of monitoring well 1349MW100 and meet the corrective action objectives of the Telecommunication Corridor Soil RU. If needed, monitoring well 1349MW100 will be abandoned as described above and a replacement monitoring well, 1349MW100R will be installed in approximately the same location after corrective action activities are completed.

Prior to the start of excavation activities, well 1349MW103 will be abandoned in accordance with the *Water Well Standards: State of California (Bulletin 74-81)* prepared by the Department of Water Resources (DWR) and Presidio Trust Standard Operating Procedure No. 006 (SOP; Tetra Tech, 2001). Groundwater monitoring wells will be over-drilled to the total depth of the well to completely remove subsurface well materials. Over-drilling activities will be conducted using a truck mounted drill rig with eight-inch-diameter hollow-stem augers. Well casing and annular material including the sand filter pack, bentonite, and grout will be removed from the borehole. After all material is removed from the resulting borehole, neat cement will be tremie grouted from total depth to ground surface.

Waste generated during well destruction activities will be temporarily containerized in 55-gallon Department of Transportation (DOT) approved drums which will be temporarily stored in the Building 1347 stockpile area. Wastes will be included in the excavation soil waste profile and will be disposed at the Trust approved disposal facility for this project.

3.3.2 Monitoring Well Installation

Two new groundwater wells will be installed to evaluate hydrogeologic conditions and verify groundwater flow conditions in the vicinity of the groundwater basin divide at the Site. Monitoring wells will be installed per Presidio Trust Standard Operating Procedure No. 004 (SOP; Tetra Tech, 2001). The additional wells will also facilitate further evaluation of the nature and extent of COC in groundwater at the Study Area. Monitoring well 1349MW106 will be installed to the north of monitoring well 1349MW100 in the vicinity of the former fuel dispensing station. Additionally, monitoring well 1348MW107 will be installed on the western side of Washington Boulevard down gradient of 1349MW100. The proposed locations of the new monitoring wells are depicted on Figure 3-4.

Drilling activities will be performed by a California-licensed driller and under the direction of a field geologist or engineer. A copy of the Department of Water Resources Well Drillers Report, Form 188, will be submitted to the Water Quality Control Section within 30 days of completion of monitoring wells.

Groundwater monitoring wells will be installed using a truck mounted drill rig with eight-inch-diameter hollow-stem augers. Continuous two-foot stainless steel split-spoon samples of soil will be collected during the advancement of the well boring per American Society for Testing and Materials (ASTM) Method D-1586 (1999). The soil from each two-foot interval will be field screened using a photoionization detector (PID) and geologic characteristics will be recorded in the field logbook.

Monitoring wells will be constructed of two-inch-diameter Schedule 40 poly-vinyl chloride (PVC). In order to intercept the groundwater tables, monitoring wells will be constructed with a 10-foot length 0.010-inch slot well

screen with a solid PVC riser. The solid riser will be installed from the top of the screen to approximately 2.5 feet above ground surface. The annular space will be filled with #2/12 Monterey Sand to at least two-feet above the top of the well screen. A hydrated bentonite slurry seal will be placed above the sand pack and the remaining annular space will be filled with neat cement to ground surface. The proposed well construction details are based on previous investigations completed at the Site. Well construction details including the filter pack and screen size will be based on formations observed during well installation activities.

Monitoring wells 1349MW103R and 1349MW107 will be fitted with locking well caps and finished in a stickup fashion approximately 3 feet aboveground with a protective steel outer casing. The vented protective steel casing will be installed over the rising casing and sealed with cement. The steel casing will extend approximately 1.5 to 2.0 feet bgs. The concrete seal will be flush with the ground surface and will extend approximately 1.5 feet below grade and laterally at least one foot in all directions from the protective steel casing, and will slope gently to drain water away from the well. A vented slip-on steel cap will be secured to the top of the protective casing. A flush-mounted monitoring well will be installed at location 1349MW106 (and 1349MW100R if a replacement well is required). It should be noted that any replacement wells (i.e. 1349MW103R and possibly 1349MW100R) will be constructed with the same well screen configurations and at approximately the same location as the original wells. Figure 3-5 presents the proposed monitoring well construction details for a typical monitoring. Well construction details may be modified based on field observation of lithologic conditions and depth of observed groundwater.

Subsequent to well installation and development activities, the horizontal location, ground elevation, and top of inner and outer casing elevations of the monitoring wells will be surveyed by a California-licensed land surveyor as described in Section 3.2.1.1.

3.3.3 Monitoring Well Development

Subsequent to the completion of the monitoring well installations and after completion of excavation and backfilling, wells will be developed to verify that wells function properly, and to remove any residual particulates that may have settled in the well during installation. The annular sealant will need to set prior to well development. Therefore, wells will not be developed within the first 24 hours following well installation. Well development will be coordinated to occur at least one week prior to the next quarterly groundwater sampling event scheduled for the Study Area.

Monitoring well development procedures will be consistent with the Presidio Trust Standard Operating Procedure No. 005 (SOP; Tetra Tech, 2001). Development will be conducted by the Trust's quarterly groundwater monitoring contractor. Development will be accomplished by surging and evacuating groundwater from the well casing using a two-inch, stainless-steel Grundfos submersible pump and dedicated polyethylene tubing or similar. Groundwater field parameters including pH, temperature and specific conductivity readings stabilize and the water is visually clear of suspended solids.

Development water will be contained in portable poly tanks and temporarily stored at the Central Magazine for waste classification and management consistent with current groundwater purgewater management.

3.3.4 Groundwater Sampling Activities

Subsequent to installing new monitoring wells, one synoptic round of groundwater elevation measurements will be collected from the monitoring well network during the next quarterly groundwater sampling event scheduled

for the Study Area. Water-level measurements will be followed by the collection of groundwater samples from all eleven wells in the monitoring well network. The following wells will be monitored:

- Existing wells: 1349MW01, 1349MW02, 1349MW03R, 1349MW100 (if not decommissioned), 1349MW101, 1349MW102, 1349MW104, 1349MW105; and
- New wells: 1349MW100R (replacement for well 1349MW100, if decommissioned), 1349MW103R (replacement for well 1349MW103), 1349MW106 (new well north of 1349MW100R), and 1349MW107 (new well west of 1349MW100R).

As described above and in the Final CAP, well 1349MW100 may be removed as a result of potential conflicts during excavation of the Telecommunications Corridor Soil RU, and well 1349MW103 will be removed during excavation activities for the Deep Soil RU but replacement wells 1349MW100R and -103R will be re-installed in the same locations following soil excavation activities. Monitoring of replacement wells 1349MW100R and -103R will commence following backfilling and site restoration.

Groundwater sampling activities will be conducted by a Trust-contracted consultant as part of the on-going Presidio-Wide Groundwater Monitoring Program. These activities are described in more detail below.

3.3.4.1 Groundwater Elevation Measurements

One round of synoptic water-level measurements will be collected at the start of each sampling event in accordance with the Presidio Standard Operating Procedures (SOP No. 002; Tetra Tech, 2001) and Field Sampling Plan (FSP; Treadwell & Rollo, 2001). Depth to water will be measured using an electronic water-level indicator (or an interface probe if immiscible phases are potentially present) from the surveyed measuring point at the top of the well casing three times and the measurement will be averaged. Depth to groundwater will be recorded in the field logbook. Measurements will be subtracted from the surveyed top of casing elevation to calculate groundwater elevations for each monitoring well. Water-level indicators or interface probes will be decontaminated between wells as specified in the SOP.

3.3.4.2 Groundwater Sampling

As described in the Final CAP (BBL, 2006), groundwater monitoring will be conducted for a period of up to 5 years. Groundwater will be analyzed quarterly for a minimum of one year for the following constituents:

- PAHs by USEPA Method 8270SIM;
- TPHg, TPHd and/or TPHfo by USEPA Method 8015 Modified;
- VOCs by USEPA Method 8260B;
- OCPs by USEPA Method 8081A;
- Dissolved metals by USEPA Method 6010;
- General chemistry parameters including total alkalinity by USEPA Method 310.1, bicarbonate by USEPA Method 2320B, carbonate by USEPA Method 2320B, chloride by USEPA Method 300.0,

fluoride by USEPA Method 300.0, nitrate as N by USEPA Method 300.0, nitrite as N by USEPA Method 300.0, and sulfate by USEPA Method 300.0;

- Sulfide by USEPA Method 376.2/SW9030;
- Total dissolved solids by USEPA Method 160.1;
- Total Organic Carbon (TOC) by USEPA Method SW 9060; and
- Field parameters including DO, specific conductance, temperature, turbidity, and pH.

If all constituents within an analytical suite have concentrations below cleanup levels for four consecutive quarterly sampling events sitewide, then the frequency of monitoring for the analytical suite will be reduced to a semi-annual basis. If after two years of semi-annual sampling, all constituents within the analytical suite have concentrations below cleanup levels sitewide, the analytical suite will no longer be analyzed in groundwater samples. Similarly, if all analyzed constituents at an individual well have concentrations below cleanup levels for four consecutive quarterly sampling events, then the frequency of monitoring for the well will be reduced to a semi-annual basis. If after two years of semi-annual sampling of the well all constituents within the well have concentrations below cleanup levels, the well will no longer be sampled. If all analytical suites and groundwater wells meet these criteria on a sitewide basis within a 5-year monitoring period, the groundwater monitoring program will be discontinued and the wells will be considered for abandonment at that time. The monitoring frequency described in this paragraph will be reviewed by the Trust, NPS and other stakeholders on an ongoing basis and the Trust may request adjustments to this sampling program, subject to Water Board approval. In accordance with Task 13 of Water Board Order R2-2003-0080, a Five-Year Status Report, which evaluates the effectiveness of this CAP for groundwater, will be completed and submitted to the Water Board for approval. This Five-Year Status Report is described in further detail in Section 3.7.3.

Monitoring wells will be purged and groundwater samples will be collected in a manner consistent with current sampling practices and in accordance with procedures outlined in, the Field Sampling Plan (FSP) (Treadwell & Rollo, 2001), and QAPP (SOP no. 002; Tetra Tech, 2001) to ensure comparability with historic data. Samples will be submitted under appropriate COCR to a Trust-contracted analytical laboratory as described in Section 3.2.5.3.

In accordance with the QAPP, quality assurance/quality control samples inclusive of blind duplicates, matrix spike/matrix spike duplicates, field blanks, temperature blanks and trip blanks will also be submitted for laboratory analysis (Tetra Tech, 2001). Field documentation will be accordance with the FSP and SOPs. Analytical methods and reporting limits will be consistent with those specified by the QAPP. The laboratory will provide electronic data deliverables (EDDs) that will be validated and imported into the Presidio database. For each sampling event, Data Val will independently review laboratory data and provide a Quality Control Summary Report. Results of the groundwater monitoring events will be presented in the Presidio-Wide Quarterly Monitoring Program Semi-Annual Reports.

3.4 Project Documentation

The Oversight Manager will maintain a Daily Site Activities Log Book during the implementation of Work Plan activities. The log book will be a bound notebook with sequentially numbered pages. Notes will taken with and indelible pen. Pertinent information summarized in the Daily Activities Log Book include:

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- Date;
 - On-going weather conditions for the day including wind conditions and precipitation;
 - Personnel and equipment on-site;
 - Description of planned and actual daily activities;
 - Volumes of materials excavated, stockpiled and/or transported for off-site disposal;
 - Details and sketches of sampling activities such as waste classification sampling, confirmation soil sampling, etc.;
 - Unforeseen or changing site conditions;
 - Visitors to the site;
 - Descriptions of dust control measures/activities;
 - Air monitoring results and equipment calibration records;
 - Documentation of instructions given to the Contractor by the Oversight Manager, Trust, NPS, etc.; and
 - Health and Safety considerations.

Site photographs will also be taken on a regular basis by the Oversight Manager to document observed conditions and activities as part of the corrective action. Photographs will likely be taken digitally. A sequential log of site photos will be kept on file detailing information regarding what is shown in the photo, what direction the photo was taken from, etc. All photos will be electronically time and date stamped. Photographs will be downloaded from the camera and files stored on compact disc. A copy of photo log can also be maintained electronically and accompany the photo files on the compact disc.

At a minimum, photographs will be taken of the following:

- Pre-corrective action conditions;
- Traffic controls;
- Site Security measures;
- Demolition pavement;
- Excavation of impacted material in each RU;
- Confirmation sampling locations;
- Stockpiling activities;
- Truck loading;
- Changing or unforeseen conditions;
- Backfilling and compaction;
- Decontamination activities; and
- Site restoration activities.

3.5 Land Use Controls

In conjunction with soil excavation activities and groundwater monitoring program, LUCs will be implemented for the Study Area for groundwater and may be implemented for shallow soils. Due to technical limitations for soil removal, soil may be left in place above cleanup levels. LUC(s) may need to be adopted for contamination left in-place based on the depth interval of soil contamination. A LUC is a non-engineering measure designed to limit exposure to the COC left in place in soil above cleanup levels considered protective for specific use(s) of the Site. The LUC prohibits specific use(s) of a site and notifies present or future owners/ tenants of the potential presence of contaminants in soil at concentrations that may not be protective of unrestricted future site use. The LUC requirements and restrictions are binding for both current and future property owners. They will remain in effect until they are formally removed or modified.

If soil with COC concentrations above cleanup levels is left in place at depths greater than 10 feet bgs, LUCs will not be adopted because exposure pathways are not complete for human and ecological receptors at this depth interval. If soil with COC concentrations above cleanup levels are left in-place following soil excavation from ground surface to 10 feet bgs, LUCs will be adopted to protect human health and the environment.

Residential human health and ecological special-status cleanup levels were selected as cleanup criteria for shallow soil (0 to 3 feet bgs and 0 to 10 feet bgs) to allow unrestricted future site use. Therefore, non-attainment of cleanup levels will require LUCs to restrict unlimited site use because current and future land use at the Building 1349 Area includes recreational with special-status ecological species potentially present (EKI, 2002). As needed, LUC Zones will be defined after the completion of corrective action activities described above if the corrective action objectives for a soil RU are not met due to technical considerations associated with excavation of potential bedrock material. The Trust, in consultation with the NPS, other stakeholders and the Water Board, will develop LUCs for proposed LUC Zone(s). If a LUC is required, a site-specific addendum to the LUCMRR and an appendix to the Corrective Action Implementation Report will be developed as discussed in the LUC Master Reference Report bullet item, below.

Land use controls will also be established for groundwater to temporarily restrict municipal or domestic uses during the groundwater monitoring period. Land use controls will be rescinded if the cleanup goals for groundwater are achieved for the Study Area.

The goals of the LUC(s) will be as follows:

- Prevent inappropriate land use of the property containing residual contamination in soil or groundwater;
- Assure that information about the property containing residual contamination in soil or groundwater is available to the public (via the LUCMRR);
- Ensure that long-term mitigation measures and monitoring requirements are carried out and maintained as described below;
- Ensure that the integrity and stability of the remedy is maintained;
- Ensure that subsequent property owners or transferees have a duty to assume any responsibility for requirements or restrictions pertaining to the residual contamination in soil when the property is transferred; and
- Ensure the Water Board would be contacted prior to a change in land use or the selected remedy.

If an LUC Zone(s) are required to be established, LUCs in the Zone(s) will include the following restrictions:

- Non-Allowable Land Uses – No sensitive uses (including housing, schools, hospitals, day car facilities, playgrounds or any other uses involving the regular and constant use by children, the infirm or the elderly) will be allowed in the LUC Zone(s). Regular and constant use is defined as one individual being present on the LUC Zone more than three hours per day, 150 days per year. Therefore, recreational and educational uses of the LUC Zone by children, the infirm or elderly not exceeding these parameters would be allowed. General recreational, commercial, office, institutional and cultural land uses will be allowed as well. No homegrown produce may be grown at the LUC Zone. Use of groundwater as a drinking water supply will also be prohibited.

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- Administrative Controls – For any project that involves excavation or intrusion into the subsurface within a LUC Zone, a project permit, including excavation clearance and project conditions and mitigations, will be applied for and approved through the Trust’s dig permit program as well as NEPA and NHPA process prior to commencement of subsurface disturbances in the LUC Zone. Soil disturbance activities within the LUC Zone will be required to adhere to a Health and Safety Plan that is consistent with the applicable health and safety standards. Workers in the area will be required to follow the Health and Safety Plan, have the appropriate level of health and safety training and use the appropriate level of personal protective equipment specified in the Health and Safety Plan.
 - Removal of LUC – If, in the future, the Trust elects to remove the LUC, a portion of the LUC Zone, or the entire LUC Zone and attempts to excavate soils at concentrations above the applicable cleanup levels, soil confirmation sampling will be required to verify that the cleanup levels have been achieved. Groundwater monitoring will be required to demonstrate that drinking water cleanup levels have been achieved to remove the LUC restriction on groundwater.
 - Management of Excavated Soil/Material – All soil excavated from a LUC Zone will be managed and/or disposed in accordance with then applicable federal, state and local laws governing the excavation, handling, management and disposal of the excavated material.
 - Imported Fill – Imported fill material used within the LUC Zone will meet the cleanup levels for unrestricted human health land use.

The procedures below will be followed to ensure that the specified LUC(s) for the Study Area are adhered to by present and future owners and users of the property:

- Project Permit Process: In advance of implementation, all Presidio plans and projects must be screened for compliance with the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA). The Trust will use its interdisciplinary NEPA/NHPA environmental screening process to notify planning/project proponents of the LUC. In addition, for any project involving excavation or subsurface intrusion within an “LUC Zone,” the Trust must approve a “dig permit” to ensure that subsurface utilities (e.g., water, gas, sewer, fiber optic) are not damaged. The Trust would also use its Excavation Clearance Permit process to notify and require adherence by excavation project proponents of the LUC restrictions and requirements.
- LUC Master Reference Report: Any LUC Zone(s) and the specific restrictions and requirements for the Building 1349 Study Area (groundwater or shallow soil) would be described in a Study Area-specific addendum to the Trust’s LUCMRR. In addition, the Study Area-specific addendum for the Building 1349 Study Area will be provided in an appendix to the Corrective Action Implementation Report. The LUCMRR, which includes a master map showing all Presidio-wide LUC Zones and a compilation of all Presidio LUC requirements and restrictions, is maintained and kept current at the Trust Library. Planning/project proponents and other members of the public may review all existing LUCs for the Presidio by reviewing the LUCMRR in the Trust Library.
- Notification and Annual Monitoring: The Trust will notify the Water Board regarding any proposed land use plan or project inconsistent with the LUC, any proposed action that may disrupt the effectiveness of the LUC, and any proposed action that could alter or eliminate the continued need for the LUC. The Trust will submit an annual Presidio LUC Report to confirm that human land uses within Presidio LUC Zones are consistent with the restrictions and requirements specified herein.

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- **Transfer of Ownership or Control:** The Trust will notify the Water Board of any anticipated transfer of ownership or control of any portion of the LUC Zone(s) for the Study Area. In the event of a transfer of ownership or control of an LUC Zone, in whole or in part, the Trust will record the Presidio's LUCMRR with the City and County of San Francisco Recorder's Office and the Federal General Services Agency (GSA) to place subsequent Presidio owners or managers on notice of the existence of the LUC Zone(s). As part of the administrative transfer of the property, the Trust will notify the subsequent owner or manager of the duty to comply with the LUC and provide a complete copy of the LUCMRR.

The LUC for groundwater will be developed by the Trust in conjunction with the NPS, other stakeholders and the Water Board. The LUC Zone area will be surveyed and recorded as part of the written LUC. The groundwater LUC will be included as an appendix to the Corrective Action Implementation Report (Section 3.7.3) and the LUC will be entered into the Trust's LUCMRR. If shallow soil LUCs are required due to technical impracticability in achieving cleanup goals, this need will be communicated by the Trust in the weekly progress meeting with the NPS, other stakeholders and the Water Board. Shallow soil LUCs will be developed by the Trust in conjunction with the NPS, other stakeholders and the Water Board. The LUC Zones will be surveyed and the LUCs will be included in the Corrective Action Implementation Report and entered into the Trust's LUCMRR, as indicated above.

3.6 LTDD Soil Tracking and Management

Low temperature thermal desorption (LTDD) soil previously used as backfill within the FDS trench and remedial excavations will be managed and tracked in accordance with the LTDD Soil Tracking and Management Plan (EKI, 2004). LTDD soil is expected to be encountered and removed during excavation of the Shallow Soil RU Area 1. Notification of the presence of LTDD soil will be addressed in the Trust's Excavation Permit (Section 3.2.2) prior to excavation activities. As part of the Excavation Permit process, the Trust will instruct the Contractor and Oversight Manager on the proper identification of LTDD soils and advise of Trust LTDD management policy. The approximate volume of LTDD soil will be recorded by the Oversight Manager upon its excavation. LTDD soils will have a waste profile that is the same as for other excavated soil at the Study Area and will be disposed at the Trust approved disposal facility, therefore special segregation of these soils prior to disposal will not be required. Following removal and off-site disposal of LTDD soil, those soils will be removed from the Trust's LTDD tracking and management system.

3.7 Implementation Schedule

Figure 3-6 presents an implementation schedule for the performance of the proposed activities. The schedule identifies pre-corrective action, corrective action, and post-corrective activities necessary to perform the work and satisfy Water Board Order No. R2-2003-0080. This schedule will be regularly updated and distributed at weekly progress meetings. The following sub-sections describe the pertinent activities.

3.7.1 Pre-Corrective Action

Pre-Corrective Action activities are mainly administrative tasks that require completion prior to beginning field activities. These tasks include:

- obtaining approval of the CAP Work Plan by the Water Board;

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- concurrently develop Bid Package during Work Plan review;
 - solicit Request for Services from preferred Trust remedial contractors;
 - review replies to the Request for Services and select Contractor; and
 - initiate applicable required permitting processes described in Section 3.2.2

As shown in Figure 3-6, pre-corrective action activities will take approximately 4 months to complete.

3.7.2 Corrective Action

Corrective Action activities will be performed to meet the objectives identified in the CAP. Anticipated corrective action activities include:

- excavating soil from the Shallow Soil RUs, Deep Soil RU, and Telecommunications Corridor RU;
- completing bottom and sidewall confirmation sampling and over-excavation as required;
- backfilling and restoring excavations to existing grade;
- transporting and disposing of excavated material at an approved waste disposal facility; and
- installing and developing four groundwater monitoring wells.

Approximately 2.5 months are anticipated to complete these activities.

3.7.3 Post-Corrective Action

Post-corrective action activities will include development of a Corrective Action Implementation Report which will become part of the administrative record documenting implementation of the soil corrective actions including:

- excavation activities;
- results of waste classification sampling;
- results of confirmation sampling;
- restoration and backfilling activities;
- boring log and monitoring well completion logs;
- the first quarter of groundwater monitoring data after completion of corrective action activities;
- all sampling laboratory reports and validation summaries;
- copies of waste manifests;
- copies of bills of lading for non-hazardous waste shipment;
- records of all dust and health and safety monitoring results and observations including equipment calibration records;
- photographs and logs;
- as-built drawings; and
- surveys and other relevant project documentation.

Approximately four months will be required to perform post-removal activities, assuming waste manifests are received within 60 days of completing excavation activities and analytical results for characterization sampling are received within 30 days of analysis. The report will be issued before October 30, 2007.

As described in Section 3.2.6, monitoring of the effectiveness of post-construction erosion control measures will be conducted. Inspection and monitoring of these measures will be conducted on a regular basis and documented with inspection record/corrective action measure field logs. Inspections will cease when sufficient vegetative cover has been established to eliminate the need for supplemental erosion control measures.

Results of the first quarter of groundwater sampling results for Building 1349 Study Area wells, post corrective action, will be presented in the Corrective Action Implementation Report. Results of on-going quarterly groundwater monitoring will be presented as part of the Presidio-Wide Semi-Annual Groundwater Monitoring Reports. Adjustments to the number of wells and frequency of sampling as described in Section 3.3 will be based on the results presented in these semi-annual reports. The Trust will prepare a Building 1349 Study Area Groundwater Monitoring Program Evaluation Report after the completion of the first four quarters of monitoring, post corrective action. The Groundwater Monitoring Program Evaluation Report will evaluate the first four quarters of monitoring data and propose recommendations for adjustments in the monitoring program based on the criteria described in Section 3.3.

In accordance with Task 13 of Water Board Order No. R2-2003-0080, a Five-Year Status Report evaluating the effectiveness of the CAP for groundwater will be issued within five years of implementation of the CAP.

4. References

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Tables

Table 1-1
Historic Groundwater Elevation Measurements
Building 1349 Study Area
Presidio Trust
San Francisco, California

Well ID	Date	Average Depth to Water (feet)	Top of Casing Elevation (feet PLLW)	Groundwater Elevation (feet PLLW)	Well Type
1349MW01	05/23/05	24.47	300.44	275.97	MW
	03/14/05	25.16	300.44	275.28	MW
	12/13/04	29.14	300.44	271.30	MW
	08/09/04	28.88	300.44	271.56	MW
	05/24/04	27.78	300.44	272.66	MW
	03/08/04	26.84	300.44	273.60	MW
	12/01/03	29.38	300.44	271.06	MW
	08/11/03	27.91	300.44	272.53	MW
	06/02/03	28.33	300.44	272.11	MW
	03/10/03	28.19	300.44	272.25	MW
	12/02/02	29.61	300.44	270.83	MW
	08/26/02	28.69	300.44	271.75	MW
	05/28/02	28.38	300.44	272.06	MW
	03/04/02	27.70	300.44	272.74	MW
	11/26/01	29.76	300.44	270.68	MW
	08/27/01	30.17	300.44	270.27	MW
	05/08/01	29.45	300.44	270.99	MW
1349MW02	05/23/05	30.25	311.22	280.97	MW
	03/14/05	32.08	311.22	279.14	MW
	12/13/04	36.85	311.22	274.37	MW
	08/09/04	35.38	311.22	275.84	MW
	05/24/04	34.20	311.22	277.02	MW
	03/08/04	34.14	311.22	277.08	MW
	12/01/03	36.66	311.22	274.56	MW
	08/11/03	35.46	311.22	275.76	MW
	06/02/03	35.03	311.22	276.19	MW
	03/10/03	35.46	311.22	275.76	MW
	12/02/02	36.98	311.22	274.24	MW
	08/26/02	35.94	311.22	275.28	MW
	05/28/02	34.95	311.22	276.27	MW
	03/04/02	35.54	311.22	275.68	MW
	11/26/01	37.75	311.22	273.47	MW
	08/27/01	36.79	311.22	274.43	MW
	05/08/01	35.47	311.22	275.75	MW
1349MW03	08/26/02	28.63	300.54	271.91	MW
	05/28/02	26.64	300.54	273.90	MW
	03/04/02	25.20	300.54	275.34	MW
	11/26/01	30.67	300.54	269.87	MW

Table 1-1
Historic Groundwater Elevation Measurements
Building 1349 Study Area
Presidio Trust
San Francisco, California

Well ID	Date	Average Depth to Water (feet)	Top of Casing Elevation (feet PLLW)	Groundwater Elevation (feet PLLW)	Well Type
1349MW03	08/27/01	29.65	300.54	270.89	MW
	05/08/01	26.56	300.54	273.98	MW
1349MW03R	05/23/05	25.29	304.13	278.84	MW
	03/14/05	23.29	304.13	280.84	MW
	12/13/04	32.69	304.13	271.44	MW
	08/09/04	30.88	304.13	273.25	MW
	05/24/04	29.40	304.13	274.73	MW
	03/08/04	28.43	304.13	275.70	MW
	12/01/03	33.33	304.13	270.80	MW
	08/11/03	31.69	304.13	272.44	MW
	06/02/03	30.48	304.13	273.65	MW
1349MW100	05/23/05	28.03	309.60	281.57	MW
	03/14/05	29.70	309.60	279.90	MW
	12/13/04	34.85	309.60	274.75	MW
	08/09/04	33.11	309.60	276.49	MW
	05/24/04	32.05	309.60	277.55	MW
	03/08/04	31.63	309.60	277.97	MW
	12/01/03	34.42	309.60	275.18	MW
	08/11/03	32.98	309.60	276.62	MW
	06/02/03	32.75	309.60	276.85	MW
	03/10/03	33.30	309.60	276.30	MW
	12/02/02	34.67	309.60	274.93	MW
1349MW101	05/23/05	28.65	311.63	282.98	MW
	03/14/05	23.87	311.63	287.76	MW
	12/13/04	33.44	311.63	278.19	MW
	08/09/04	32.10	311.63	279.53	MW
	05/24/04	32.23	311.63	279.40	MW
	03/08/04	32.90	311.63	278.73	MW
	12/01/03	35.25	311.63	276.38	MW
	08/11/03	34.14	311.63	277.49	MW
	06/02/03	33.59	311.63	278.04	MW
1349MW102	05/23/05	23.33	305.68	282.35	MW
	03/14/05	23.95	305.68	281.73	MW
	12/13/04	28.35	305.68	277.33	MW
	08/09/04	26.89	305.68	278.79	MW
	05/24/04	25.68	305.68	280.00	MW
	03/08/04	25.62	305.68	280.06	MW
	12/01/03	28.17	305.68	277.51	MW
	08/11/03	26.96	305.68	278.72	MW

Table 1-1
Historic Groundwater Elevation Measurements
Building 1349 Study Area
Presidio Trust
San Francisco, California

Well ID	Date	Average Depth to Water (feet)	Top of Casing Elevation (feet PLLW)	Groundwater Elevation (feet PLLW)	Well Type
1349MW102	06/02/03	26.51	305.68	279.17	MW
1349MW103	05/23/05	34.70	318.07	283.37	MW
	03/14/05	37.18	318.07	280.89	MW
	12/13/04	40.93	318.07	277.14	MW
	08/09/04	39.49	318.07	278.58	MW
	05/24/04	38.40	318.07	279.67	MW
	03/08/04	38.75	318.07	279.32	MW
	12/01/03	40.69	318.07	277.38	MW
	08/11/03	39.51	318.07	278.56	MW
	06/02/03	39.33	318.07	278.74	MW
1349MW104	05/23/05	31.42	314.58	283.16	MW
	03/14/05	33.73	314.58	280.85	MW
	12/13/04	37.65	314.58	276.93	MW
	08/09/04	36.23	314.58	278.35	MW
	05/24/04	35.18	314.58	279.40	MW
	03/08/04	35.76	314.58	278.82	MW
	12/01/03	37.43	314.58	277.15	MW
	08/11/03	36.27	314.58	278.31	MW
	06/02/03	35.96	314.58	278.62	MW
1349MW105	05/23/05	31.54	312.05	280.51	MW
	03/14/05	33.25	312.05	278.80	MW
	12/13/04	34.71	312.05	277.34	MW
	08/09/04	33.33	312.05	278.72	MW
	05/24/04	33.20	312.05	278.85	MW
	03/08/04	33.71	312.05	278.34	MW
	12/01/03	34.38	312.05	277.67	MW
	08/11/03	33.77	312.05	278.28	MW
	06/02/03	34.20	312.05	277.85	MW
LF5GW100	05/24/04	9.05	229.74	220.69	MW
	03/08/04	9.10	229.74	220.64	MW
	12/01/03	9.30	229.74	220.44	MW
	08/11/03	6.71	229.74	223.03	MW
	06/02/03	6.98	229.74	222.76	MW
	03/10/03	9.10	229.74	220.64	MW
	12/02/02	7.17	229.74	222.57	MW
	08/26/02	5.05	229.74	224.69	MW
	05/28/02	6.31	229.74	223.43	MW
	03/04/02	5.25	229.74	224.49	MW
	11/26/01	6.73	229.74	223.01	MW

Table 1-1
Historic Groundwater Elevation Measurements
Building 1349 Study Area
Presidio Trust
San Francisco, California

Well ID	Date	Average Depth to Water (feet)	Top of Casing Elevation (feet PLLW)	Groundwater Elevation (feet PLLW)	Well Type
LF5GW100	08/27/01	11.09	229.74	218.65	MW
	5/8/2001	6.32	229.74	223.42	MW
LF5GW101	05/23/05	6.10	234.36	228.26	MW
	03/14/05	3.84	234.36	230.52	MW
	12/13/04	7.10	234.36	227.26	MW
	08/09/04	7.42	234.36	226.94	MW
	05/23/05	9.38	229.74	220.36	MW
	03/14/05	9.10	229.74	220.64	MW
	12/13/05	9.10	229.74	220.64	MW
	08/09/04	9.20	229.74	220.54	MW
	05/24/04	4.95	234.36	229.41	MW
	03/08/04	3.97	234.36	230.39	MW
	12/01/03	5.15	234.36	229.21	MW
	08/11/03	5.95	234.36	228.41	MW
	06/02/03	5.78	234.36	228.58	MW
	03/10/03	6.85	234.36	227.51	MW
	12/02/02	9.19	234.36	225.17	MW
	08/26/02	5.84	234.36	228.52	MW
	05/28/02	8.65	234.36	225.71	MW
	03/04/02	6.77	234.36	227.59	MW
	11/26/01	8.38	234.36	225.98	MW
	08/27/01	6.66	234.36	227.70	MW
	05/08/01	2.00	234.36	232.36	MW
LF5GW102	05/23/05	27.92	294.76	266.84	MW
	03/14/05	29.35	294.76	265.41	MW
	12/13/04	31.02	294.76	263.74	MW
	08/09/04	30.33	294.76	264.43	MW
	05/24/04	29.67	294.76	265.09	MW
	03/08/04	30.51	294.76	264.25	MW
	12/01/03	31.23	294.76	263.53	MW
	08/11/03	30.75	294.76	264.01	MW
	06/02/03	29.35	294.76	265.41	MW
LF5GW103	05/23/05	11.14	279.12	267.98	MW
	03/14/05	10.90	279.12	268.22	MW
	12/13/04	14.64	279.12	264.48	MW
	08/09/04	14.38	279.12	264.74	MW
	05/04/04	13.31	279.12	265.81	MW
	03/08/04	13.47	279.12	265.65	MW
	12/01/03	14.31	279.12	264.81	MW

Table 1-1
 Historic Groundwater Elevation Measurements
 Building 1349 Study Area
 Presidio Trust
 San Francisco, California

Well ID	Date	Average Depth to Water (feet)	Top of Casing Elevation (feet PLLW)	Groundwater Elevation (feet PLLW)	Well Type
LF5GW103	08/11/03	13.45	279.12	265.67	MW
	06/02/03	12.33	279.12	266.79	MW
LF5GW104	05/23/05	20.24	286.05	265.81	MW
	03/14/05	19.48	286.05	266.57	MW
	12/13/04	26.25	286.05	259.80	MW
	08/09/04	26.64	286.05	259.41	MW
	05/24/04	25.45	286.05	260.60	MW
	03/08/04	20.89	286.05	265.16	MW
	12/01/03	27.06	286.05	258.99	MW
	08/11/03	25.35	286.05	260.70	MW
	06/02/03	23.44	286.05	262.61	MW

Notes

All depth to water measurements are an average of three measurements recorded in the field.

MW - Monitoring well

feet PLLW - feet above Presidio lower low water vertical datum

Table 1-2
Summary of Previous Site Investigation and Corrective Actions
Building 1349 Study Area
Presidio Trust
San Francisco, California

Investigation Report	Date/Performed By	Summary of Activity	Potential Contaminants of Concern
Final Building 1349 Site Investigation	January 1995/Montgomery Watson	<p>Site investigation conducted in two phases at the Site.</p> <p>Phase 1: Fourteen soil borings were advanced in August 1993.</p> <ul style="list-style-type: none"> • One grab groundwater sample and 51 soil samples were collected for TPHd, BTEX, and metals. • Analytical results indicated high soil concentrations of TPHd in the area of the former drainage gully, east of Washington Boulevard. <p>Phase 2: Eight soil borings were advanced in February 1994.</p> <ul style="list-style-type: none"> • Thirty-seven soil samples and one groundwater sample were collected for TPHd and BTEX analyses. • Analytical results indicated high soil concentrations of TPHd in the area of the former drainage gully, east of Washington Boulevard and groundwater. • Select soil samples were analyzed for physical and biological parameters to help assess potential soil remediation technologies. • A leaking, shallow underground fuel pipe between the tank and fuel dispensing structure was located and identified as a potential source area. • High-resolution seismic reflection study indicated up to eight bedrock lineaments at the site. 	TPHd

Table 1-2
Summary of Previous Site Investigation and Corrective Actions
Building 1349 Study Area
Presidio Trust
San Francisco, California

Investigation Report	Date/Performed By	Summary of Activity	Potential Contaminants of Concern
Final Building 1349 Additional Site Investigation	May 1996/Montgomery Watson	<p>Phase 3: Nine soil borings were advanced to depths ranging from approximately 38 to 58 feet below ground surface (bgs).</p> <ul style="list-style-type: none"> Relatively low concentrations of TPHd were detected from 0 to 30 feet bgs with concentrations ranging from 1.0 to 7.7 mg/kg, and increasing concentrations of TPHd were observed in soil from 30 to 50 feet bgs ranging from 330 to 990 mg/kg. TPHd was detected in three grab groundwater samples at concentrations of 1,300 ppb, 24,000 ppb, and 4,700 ppb. Concentrations in groundwater were above the cleanup level of 880 ppb. Three groundwater monitoring wells were installed in converted soil borings. 	TPHd
Aboveground Storage Tank Closure	May 1996/IT Corporation	<p>Removal action activities included the removal of Building 1349 and associated piping. In addition, soil was removed from the areas at the site as follows:</p> <ul style="list-style-type: none"> <u>Area 1:</u> Excavation area of approximately 25 by 35 feet to a depth of 7.0 feet bgs. <u>Area 2:</u> Excavation area of approximately 70 by 25 feet to a depth of 12 feet bgs. <u>Area 3:</u> Excavation area of approximately 40 by 50 feet to a depth of 13.2 feet bgs. <p>Confirmation samples were collected for soil remaining in place. Concentrations of TPHd in soil ranged from 14,000 to 24,000 mg/kg beneath the communications conduit at 3.0 feet bgs. Two additional samples were collected at depths of 4 and 6 feet bgs. TPHd was detected at concentrations of 13,000 and 14,000 mg/kg. Four samples were collected at 12 feet bgs with concentrations of TPHd ranging from 3,200 to 10,000 mg/kg. PAHs were detected at a maximum concentration of 51 mg/kg for naphthalene.</p>	TPHd and PAHs

Table 1-2
Summary of Previous Site Investigation and Corrective Actions
Building 1349 Study Area
Presidio Trust
San Francisco, California

Investigation Report	Date/Performed By	Summary of Activity	Potential Contaminants of Concern
Fuel Distribution System Closure Report	May 1999/IT Corporation	<p>A portion of the Presidio-wide FDS piping removal corrective action. Two FDS pipeline removal actions, MT-6 and MT-7, occurred in the vicinity of Building 1349 (IT, 1995).</p> <ul style="list-style-type: none"> Approximately 1,000 linear feet of 6-inch pipeline were excavated and removed from the MT-6 area and 2,000 linear feet excavated and removed from MT-7. Trench excavations were backfilled with overburden soil from the excavations to 18 inches bgs and with imported topsoil from 18 inches bgs to ground surface. <p>Three FDS Remedial Excavations (total of approximately 190 cubic yards) were completed in the area north of Building 1349 at areas overlapping former MT-6 and MT-7 excavations.</p> <ul style="list-style-type: none"> Post-excavation confirmation soil samples were collected from the bottoms and sidewalls of the excavations. Field immunoassay analytical tests were performed on the confirmation samples as well as laboratory confirmation analysis based on the field immunoassay results (IT, 1999). Immunoassay and laboratory analytical results indicate that soils with TPH and PAHs exceeding the action levels were left in place. Excavated soils were LTDD-treated and used as backfill. 	TPHd, TPHfo and PAHs

Table 1-2
Summary of Previous Site Investigation and Corrective Actions
Building 1349 Study Area
Presidio Trust
San Francisco, California

Investigation Report	Date/Performed By	Summary of Activity	Potential Contaminants of Concern
Additional Investigation of Fuel Distribution Systems	August 1999/Montgomery Watson	Investigation of former FDS pipeline trending south from Building 1349 across Washington Blvd. <ul style="list-style-type: none"> • Soil borings advanced at 100-foot intervals along former pipeline. • TPHfo not detected above 115 mg/kg. • Decision document indicating “no further action” recommended. 	None
Draft Building 1349 Site Investigation Report	October 2003/Treadwell & Rollo	Soil and groundwater data gap assessment. Total of 31 soil borings advanced to various depths. <ul style="list-style-type: none"> • Soil and grab groundwater samples analyzed for TPHd, TPHfo and PAHs. • Shallow soil samples collected at 2.5 feet bgs to 7.5 feet bgs from nine borings from the former FDS remedial excavations and FDS trench excavations contained TPHd, TPHfo and several PAH concentrations above their respective cleanup levels. • Deep soil samples collected at 12 feet bgs and 20 feet bgs from 1349SB127 at former FDS remedial excavation contained TPHd at 17,000 mg/kg and naphthalene at 17 mg/kg. • TPHd exceedances of cleanup levels detected in grab groundwater samples collected from borings 1349SB103, 1349SB108 and 1349SB111. 	TPHd, TPHfo, PAHs, and OCPs (OCPs in groundwater only)

Table 1-2
Summary of Previous Site Investigation and Corrective Actions
Building 1349 Study Area
Presidio Trust
San Francisco, California

Investigation Report	Date/Performed By	Summary of Activity	Potential Contaminants of Concern
Draft Building 1349 Site Investigation Report (Continued)	October 2003/Treadwell & Rollo	<p>Seven monitoring wells installed at the site (1349MW100 through 1349MW105) including replacement well 1349MW03R.</p> <ul style="list-style-type: none"> Wells included in quarterly Presidio-wide groundwater monitoring network. TPHd and PAHs detected at 1349MW100 above their respective cleanup levels. Several OCPs detected at concentrations above screening levels at 1349MW100; most data qualified or of apparent low quality. <p>PAHs detected in excess of cleanup goals once at 1349MW03 during Fourth Quarter 2001.</p>	TPHd, TPHfo, PAHs, and OCPs (OCPs in groundwater only)

Notes:

TPHd – total petroleum hydrocarbons as diesel

TPHfo – total petroleum hydrocarbons as fuel oil (using a motor oil standard with carbon range C24-C36)

TPHg – total petroleum hydrocarbons as gasoline.

VOCs – volatile organic compounds

BTEX – benzene, toluene, ethylene, and xylenes

OCPs – Organochlorine Pesticides

PAHs – polycyclic aromatic hydrocarbons

FDS – - Fuel Distribution System

mg/kg – milligrams per kilogram

µg/L – micrograms per liter

µg/kg – micrograms per kilogram

LTTD – Low Temperature Thermal Desorption

Table 1-3
Summary of Soil Cleanup Levels
Building 1349 Study Area
Presidio Trust
San Francisco, California

Chemical	Protection of Human Health Recreational Cleanup Level ^a	Protection of Human Health Residential Cleanup Level ^{a,b,d}	Protection of Ecological Receptors Cleanup Level for Special-Status Receptors ^a	Background Metal Concentrations for Serpentine Soil ^f	QAPP Analytical Reporting Limit	Laboratory Detection Limit	Effective Soil Cleanup Level Soil 0 to 3 feet bgs ^c	Effective Soil Cleanup Level Soil 3 to 10 feet bgs ^d
Metals (mg/kg) ^f								
Antimony	70	29	5	3.0	0.2	0.25	5	29
Arsenic	0.88	0.36	10	5.4	0.2	0.25	5.4	5.4
Barium	12,000	5,000	320	230	0.2	0.25	320	5,000
Beryllium	350	140	10	1.1	0.1	0.1	10	140
Cadmium	4.2	1.7	0.017	1.9	0.1	0.25	1.9	1.9
Chromium	2,800	1,200	4	1,700	0.2	0.5	1,700	1,700
Cobalt	10,000	4,000	20	170	0.2	0.25	170	4,000
Copper	--	--	30	85	0.2	0.5	85	--
Iron	--	--	--	--	5.0	10	--	--
Lead	500	400	160	66	0.1	0.25	160	400
Manganese	--	--	--	--	0.1	0.5	--	--
Mercury	52	20	0.4	0.2	0.1	0.02	0.4	20
Nickel	3,500	1,400	30	4,500	0.2	0.25	4,500	4,500
Selenium	870	360	0.2	0.5	0.2	0.25	0.5	360
Thallium	14	5.7	0.15	1.0	0.2	0.25	1.0	5.7
Vanadium	1,600	650	2	74	1.0	0.25	74	650
Zinc	52,000	22,000	4	160	0.2	1	160	22,000

Table 1-3
Summary of Soil Cleanup Levels
Building 1349 Study Area
Presidio Trust
San Francisco, California

Chemical	Protection of Human Health Recreational Cleanup Level ^a	Protection of Human Health Residential Cleanup Level ^{a,b,d}	Protection of Ecological Receptors Cleanup Level for Special-Status Receptors ^a	QAPP Analytical Reporting Limit	Laboratory Detection Limit	Effective Soil Cleanup Level Soil 0 to 3 feet bgs ^c	Effective Soil Cleanup Level Soil 3 to 10 feet bgs ^d
Organochlorine Pesticides (mg/kg) ^h							
Aldrin	0.07	0.029	0.0039	0.002	0.0017	0.0039	0.029
alpha-BHC	0.44	0.18	0.062	0.002	0.0017	0.062	0.18
beta -BHC	0.79	0.32	0.062	0.002	0.0017	0.062	0.3
delta-BHC	0.44	0.18	0.062	0	0.0	0.062	0.18
Chlordane (α and γ)	0.91	0.37	0.009	0	0.0017	0.009	0.37
4,4-DDD	4.9	2	0.049	0.002	0.0	0.049	2
4,4-DDE	3.5	1.4	0.098	0.004	0.0	0.098	1.4
4,4-DDT	3.5	1.4	0.0082	0.004	0.0	0.0082	1.4
Dieldrin	0.074	0.03	0.039	0.004	0.0	0.03	0.03
Endosulfan	900	370	1.1	0.002	0.0	1.1	370
Endosulfan sulfate	900	370	1.1	0	0.0	1.1	370
Endrin	45	18	0.004	0.004	0.0	0.004	18
Endrin aldehyde	45	18	0.004	0.0	0.0033	0.004	18
gamma-BHC	1.1	0.44	0.01	0.002	0.0	0.01	0.44
Heptachlor	0.29	0.12	0.017	0.002	0.0	0.017	0.12
Heptachlor epoxide	0.21	0.088	0.017	0.002	0.0	0.017	0.088
Methoxychlor	750	310	0.44	0.02	0.0	0.44	310

Table 1-3
Summary of Soil Cleanup Levels
Building 1349 Study Area
Presidio Trust
San Francisco, California

Chemical	Protection of Human Health Recreational Cleanup Level ^a	Protection of Human Health Residential Cleanup Level ^{a,b,d}	Protection of Ecological Receptors Cleanup Level for Terrestrial Receptors ^a	Protection of Groundwater Resources Soil Cleanup Level to Maintain Drinking Water Standard Soil Less Than 5 feet Above Groundwater ^a	QAPP Analytical Reporting Limit	Laboratory Detection Limit	Effective Soil Cleanup Level Soil 0 to 3 feet bgs ^c	Effective Soil Cleanup Level Soil 3 to 10 feet bgs ^d	Effective Soil Cleanup Level Soil Greater Than 10 feet bgs and Less Than 5 feet above groundwater ^e
Polycyclic Aromatic Hydrocarbons (mg/kg) ^g									
Acenaphthene	6,600 h	2,700 h	--	--	0.33	0.0035	2,700	2,700	--
Acenaphthylene	--	--	--	--	0.33	0.0035	--	--	--
Anthracene	13,800	5,900	--	308	0.33	0.0035	5,900	5,900	308
Benzo(a)anthracene	1	0.43	--	8	0.33	0.0035	0.43	0.43	8
Benzo(a)pyrene	0.1	0.04	0.3	3	0.33	0.0035	0.04	0.04	3
Benzo(b)fluoranthene	1	0.43	--	23	0.33	0.0035	0.43	0.43	23
Benzo(g,h,i)perylene	1,400	620	--	5,040	0.33	0.0035	620	620	5,040
Benzo(k)fluoranthene	1	0.43	--	23	0.33	0.0035	0.43	0.43	23
Chrysene	10	4.3	--	54	0.33	0.0035	4.3	4.3	54
Dibenzo(a,h) anthracene	0.19 h	0.078 h	--	--	0.33	0.0035	0.078	0.078	--
Fluoranthene	1,900	820	--	316	0.33	0.0035	820	820	316
Fluorene	1,800	770	--	60	0.33	0.0035	770	770	60
Indeno(1,2,3-cd)Pyrene	0.65 h	0.27 h	--	--	0.33	0.0035	0.27	0.27	--
Naphthalene	1,100	480	--	9	0.33	0.0035	480	480	9
Phenanthrene	1,400	600	--	86	0.33	0.0035	600	600	86
Total Carcinogenic PAH	13	5.6	--	111	--	--	5.6	5.6	111
Pyrene	1,400	620	--	241	0.33	0.0035	620	620	241

Table 1-3
Summary of Soil Cleanup Levels
Building 1349 Study Area
Presidio Trust
San Francisco, California

Chemical	Protection of Human Health Recreational Cleanup Level ^a	Protection of Human Health Residential Cleanup Level ^{a,b,d}	Protection of Ecological Receptors Cleanup Level for Terrestrial Receptors ^a	Protection of Groundwater Resources Cleanup Level for Soil to Maintain Drinking Water Standard Soil Less Than 5 feet Above Groundwater ^a	Protection of Groundwater Resources Cleanup Level for Soil to Maintain Drinking Water Standard Soil Greater Than 5 feet Above Groundwater ^a	QAPP Analytical Reporting Limit	Laboratory Detection Limit
Petroleum Hydrocarbons and Constituents (mg/kg) ^g							
TPH (as diesel)	3,200	1,380	700	115	15,000	10	0.001
TPH (as fuel oil) ⁱ	4,500	1,900	980	160	15,000	10	0.005
TPH (as gasoline)	2,400	1,030	610	100	5,000	1.0	0.001
Benzene	1.5	0.6	40	0.005	140	0.005	0.005
Toluene	1,200	530	270	0.005	420	0.005	0.005
Ethylbenzene	1,900	840	125	0.009	60	0.010	0.005
Total Xylenes	2,500	1,080	55	0.009	180	0.005	0.005

	Effective Soil Cleanup Level Soil 0 to 3 feet bgs ^c	Effective Soil Cleanup Level Soil 3 to 10 feet bgs ^d	Effective Soil Cleanup Level Soil Greater Than 10 feet bgs and Less Than 5 feet above groundwater ^e	Effective Soil Cleanup Level Soil Greater Than 10 feet bgs and Greater Than 5 feet above groundwater ^e
Petroleum Hydrocarbons and Constituents (mg/kg) ^g				
TPH (as diesel)	700	1,380	115	15,000
TPH (as fuel oil) ⁱ	980	1,900	160	15,000
TPH (as gasoline)	610	1,030	100	5,000
Benzene	0.6	0.6	0.005	140
Toluene	270	530	0.005	420
Ethylbenzene	125	840	0.009	60
Total Xylenes	55	1,080	0.009	180

Table 1-3
Summary of Soil Cleanup Levels
Building 1349 Study Area
San Francisco, California

Notes

bgs - below ground surface

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

PAHs - Polycyclic aromatic hydrocarbons

TPH - Total petroleum hydrocarbons

QAPP - Quality Assurance Project Plan

--- = Cleanup level is not available.

All Cleanup Levels are directly from the Final CAP (BBL, 2006). Explanation of Cleanup Level Sources from Final CAP listed below:

a Cleanup level values listed are obtained from Tables 1, 2 and 4 of Regional Water Quality Control

b Although the Building 1349 Study Area is located within a planned recreational land use zone, more conservative residential cleanup levels have been used to evaluate risk, select COCs, and facilitate follow-on decisions for potential unrestricted land use of a remedial unit, post remediation.

c Residential and ecological cleanup levels are the applicable cleanup levels for soil from 0 to 3 feet bgs. For metals, background concentrations for serpentinite soil are selected if higher.

d Residential cleanup levels are the applicable cleanup levels for soil from 3 to 10 feet bgs. For metals, background concentrations for serpentinite soil are selected if higher.

e Protection of groundwater resources cleanup levels for soil to maintain drinking water standards in groundwater are the applicable cleanup levels for soil greater than 10 feet bgs.

f Cleanup levels and background concentrations for metals obtained from Cleanup Levels Document (EKI, 2002).

g Cleanup levels for petroleum-related compounds obtained from SCRs, Order No. R2-2003-080 (RWQCB, 2003).

h Cleanup level obtained from Table 7-2 (Non-petroleum compounds) in the Cleanup Levels Document (EKI, 2002)

i These values also apply to TPH as motor oil.

Table 1-4
Summary of Groundwater Cleanup Levels
Building 1349 Area
Presidio of San Francisco, California

Chemical	QAPP Analytical Reporting Limits (µg/L)	Laboratory Reporting Limits (µg/L)	Drinking Water Groundwater Cleanup Level ^a (µg/L)
Petroleum Hydrocarbons and Constituents			
TPHg (C ₇ -C ₁₂)	50	50	770
TPHd (C ₁₂ -C ₂₄)	50	50	880
TPHfo ^b (C ₂₄ -C ₃₆)	300	250	1,200
Benzene	0.01	0.5	1.0
Toluene	0.05	0.5	150
Ethylbenzene	0.5	0.5	700
Total Xylenes	0.5	0.5	1,750
Polycyclic Aromatic Hydrocarbons (PAHs)			
Acenaphthene	10	0.2	420 ^c
Acenaphthylene	10	0.2	280 ^c
Anthracene	10	0.5	770
Benzo(a)anthracene	10	0.1	0.1
Benzo(a)pyrene	10	0.1	0.2
Benzo(b)fluoranthene	10	0.2	0.2
Benzo(g,h,i)perylene	10	0.2	150
Benzo(k)fluoranthene	10	0.1	2
Chrysene	10	0.1	20
Dibenzo(a,h)anthracene	10	0.2	0.0085 ^{c,d}
Flouranthene	10	0.4	300
Fluorene	10	1	300
Naphthalene	10	1	300
Indeno(1,2,3-cd)pyrene	10	0.14	0.029 ^{c,d}
Phenanthrene	10	0.5	230
Pyrene	10	0.2	230
Volatile Organic Compounds (VOCs)			
2-butanone	10	10	4,200 ^c
Acetone	10	10	700 ^c
Bromoform	0.5	1	100 ^c
Carbon disulfide	5	0.5	--
Dibromochloromethane	0.5	0.5	100 ^c
Methyl t-butyl ether (MTBE)	2	0.5	13
Metals			
Aluminum	50	50	--
Antimony	2	1	6
Arsenic	2	1	10
Barium	1	1	1,000
Beryllium	1	1	4
Cadmium	1	1	5
Calcium	50	50	--
Chromium	2	1	50
Chromium VI	0.5	10	21 ^c
Cobalt	1	1	140 ^c
Copper	2	1	1,000
Iron	50	50	--
Lead	1	1	15
Magnesium	50	50	--

Table 1-4
Summary of Groundwater Cleanup Levels
Building 1349 Area
Presidio of San Francisco, California

Chemical	QAPP Analytical Reporting Limits (µg/L)	Laboratory Reporting Limits (µg/L)	Drinking Water Groundwater Cleanup Level ^a (µg/L)
Metals			
Manganese	1	1	--
Mercury	0.2	0.2	2
Nickel	2	1	100
Potassium	50	50	--
Selenium	2	1	50
Silver	1	1	50
Sodium	50	50	--
Thallium	1	1	2
Vanadium	10	1	15 ^c
Zinc	2	20	5,000
Pesticides/Herbicides			
Aldrin	0.05	0.05	0.002 ^{c,d}
alpha-BHC	0.05	0.05	---
beta-BHC	0.05	0.05	0.3
delta-BHC	0.05	0.05	---
gamma-BHC	0.05	0.05	0.2
Chlordane (alpha and gamma) ^e	0.5	0.05	0.1
4,4-DDD	0.1	0.01	0.15 ^c
4,4-DDE	0.1	0.01	0.10 ^c
4,4-DDT	0.1	0.01	0.10 ^c
Dieldrin	0.1	0.05	0.5
Endosulfan	0.1	0.01	42 ^c
Endosulfan sulfate	0.1	0.1	---
Endrin	0.1	0.01	2
Endrin aldehyde	0.1	0.1	2
Heptachlor	0.05	0.025	0.01 ^d
Heptachlor epoxide	0.05	0.025	0.01 ^d
Methoxychlor	0.5	0.025	40
2,4-DB	---	1	290 ^d
2,4-D	0.25	1	70

Notes

µg/L - micrograms per liter

--- = Cleanup level is not available.

QAPP - Quality Assurance Project Plan

TPHd - total petroleum hydrocarbons as diesel

TPHg - total petroleum hydrocarbons as gasoline

TPHfo - total petroleum hydrocarbons as fuel oil

a Development of Presidio-wide Cleanup Levels for Soil, Sediment, Groundwater and Surface Water, Presidio of San Francisco (EKL, 2002), Table 7-6, Cleanup Levels for Surface Water, Seeps, and Groundwater at the Presidio of San Francisco (Drinking Water Cleanup Level) or maximum contaminant levels (MCLs), if available

b These values also apply to TPH as motor oil

c Values are Environmental Screening Levels (ESLs) for drinking water (RWQCB, 2003b)

d Drinking water level is lower than laboratory reporting limit. Therefore, laboratory reporting limit is selected as achievable cleanup level.

e Cleanup level for chlordane is applied to the sum of both isomers. Both isomers are reported in laboratory data

Table 3-1
Summary of Remedial Units and Contaminants of Concern
Building 1349 Area
Presidio Trust
San Francisco, California

Remedial Units	Depth (feet)	Estimated Surface Area (square feet) ⁽¹⁾	Estimated Thickness (feet) ⁽¹⁾	Estimated Volume In-Situ (cubic yards) ⁽¹⁾	COCs ⁽³⁾
SOIL					
Shallow Soil - Area 1	0 to 7-9 feet bgs	2130	7-9	630	TPHd, TPHfo B(a)P, D(a,h)A, chrysene
Shallow Soil - Area 2	0 to 3 feet bgs	270	3	30	B(a)P, D(a,h)A
Shallow Soil - Area 3	0 to 10 feet bgs	405	10	150	TPHd
Deep Soil	10 to 22 feet bgs	70	12	30	TPHd
Telecommunications Conduit	0 to 16 feet bgs ⁽²⁾	960	16	570	TPHd, PAHs
Total				1410	
GROUNDWATER					
Building 1349 Area Groundwater	NA	NA	NA	NA	TPHd, TPHg, benzene, PAHs, OCPs, arsenic

Notes

NA - Not Applicable

TPHd - TPH as diesel fuel

TPHfo - TPH as fuel oil

TPH - Total petroleum hydrocarbons

B(a)P - Benzo(a)Pyrene

D(a,h)A - Dibenz(a,h)Anthracene

OCPs - Organochlorine pesticides

PAHs - Polycyclic aromatic hydrocarbons

COCs - Contaminants of Concern

(1) Surface area, thickness, and volume estimated using target excavation areas (Figure 5-1).

(2) 16 feet bgs assumed as an estimate for approximate depth of contamination before bedrock. Actual depth and limits of excavation will be determined by post excavation confirmation sampling.

(3) Although metals and OCPs are not COCs for the soil RUs, they will be analyzed in soil confirmation samples (see Table 5-1).

Table 3-2
Threshold Limit Concentrations
Building 1349 Area
Presidio Trust
San Francisco, California

Analyte	TTLCL (mg/kg)	TCLP (mg/L)	STLC (mg/L)
Metals			
Antimony	500	--	15
Arsenic	500	5.0	5.0
Barium	10,000	100	100
Beryllium	75	--	0.75
Cadmium	100	1.0	1.0
Chromium	2,500	5.0	5.0
Cobalt	8,000	--	80
Copper	2,500	--	25
Hexavalent Chromium	500	--	5.0
Lead	1,000	5.0	5.0
Mercury	20	0.2	0.2
Molybdenum	3,500	--	350
Nickel	2,000	--	20
Selenium	100	1.0	1.0
Silver	500	5.0	5.0
Thallium	700	--	7.0
Vanadium	2,400	--	24
Zinc	5,000	--	250
Volatile Organic Compounds			
Benzene	--	0.5	--
2-Butanone	--	200	--
Carbon Tetrachloride	--	0.5	--
Chlorobenzene	--	100	--
Chloroform	--	6.0	--
1,1-Dichloroethene	--	0.7	--
1,2-Dichloroethane	--	0.5	--
1,4-Dichlorobenzene	--	7.5	--
Tetrachloroethene	--	0.7	--
Trichloroethene	2,040	0.5	204
Vinyl Chloride	--	0.2	--
Semivolatile Organic Compounds			
2,4-Dinitrotoluene	--	0.13	--
Hexachlorobenzene	--	0.13	--
Hexachlorobutadiene	--	0.5	--
Hexachloroethane	--	3.0	--
2-Methylphenol	--	200	--

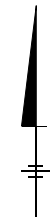
Table 3-2
Threshold Limit Concentrations
Building 1349 Area
Presidio Trust
San Francisco, California

Analyte	TTLC (mg/kg)	TCLP (mg/L)	STLC (mg/L)
4-Methylphenol	--	200	--
Nitrobenzene	--	2.0	--
Pentachlorophenol	17	100	1.7
Pyridine		5.0	--
2,4,5-Trichlorophenol	--	400	--
2,4,6-Trichlorophenol	--	2.0	--
Pesticides			
Aldrin	1.4	--	0.14
Chlordane	2.5	0.03	0.25
2,4-D	--	10	--
DDT, DDE, DDD	1.0	--	0.1
Dieldrin	8.0	--	0.8
Endrin	0.2	0.02	0.02
Heptachlor	4.7	0.008	0.47
Heptachlor epoxide	--	0.008	--
Lindane	4.0	0.4	0.4
Methoxychlor	100	10	10
Toxaphene	5.0	0.5	0.5
2,4,5-TP (Silvex)	--	1.0	--

Notes:

mg/kg	milligrams per kilogram
mg/l	milligrams per liter
--	No standard for the indicated compound
TTLC	Total threshold limit concentration
STLC	Soluble threshold limit concentration times
TCLP	Toxicity characteristic leachate procedure
TTLC, STLC, and TCLP from <i>CA Code of Regulations</i> , Title 22, Sec.66261.24	

Figures



NOTES:

1. DRAWING NOT TO SCALE.
2. DATA OBTAINED FROM: DRAFT SITE INVESTIGATION REPORT, TREADWELL AND ROLLO, OCTOBER 2003.

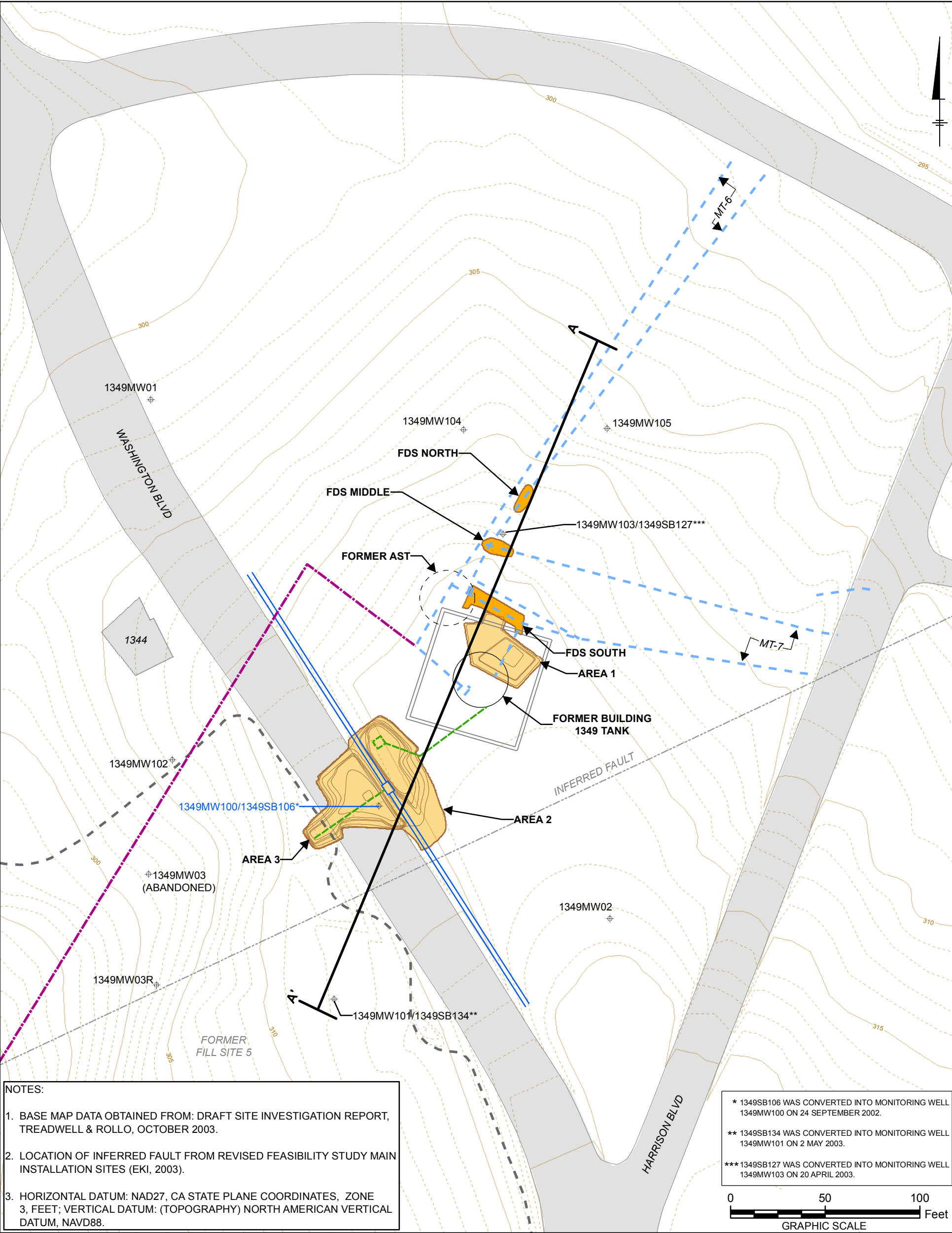
BUILDING 1349 STUDY AREA
THE PRESIDIO TRUST
SAN FRANCISCO, CALIFORNIA
CORRECTIVE ACTION PLAN
IMPLEMENTATION WORK PLAN

SITE LOCATION MAP



BBL
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

FIGURE
1-1



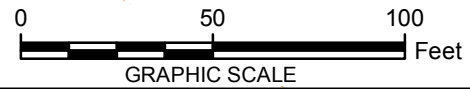
NOTES:

1. BASE MAP DATA OBTAINED FROM: DRAFT SITE INVESTIGATION REPORT, TREADWELL & ROLLO, OCTOBER 2003.
2. LOCATION OF INFERRED FAULT FROM REVISED FEASIBILITY STUDY MAIN INSTALLATION SITES (EKI, 2003).
3. HORIZONTAL DATUM: NAD27, CA STATE PLANE COORDINATES, ZONE 3, FEET; VERTICAL DATUM: (TOPOGRAPHY) NORTH AMERICAN VERTICAL DATUM, NAVD88.

* 1349SB106 WAS CONVERTED INTO MONITORING WELL 1349MW100 ON 24 SEPTEMBER 2002.

** 1349SB134 WAS CONVERTED INTO MONITORING WELL 1349MW101 ON 2 MAY 2003.

*** 1349SB127 WAS CONVERTED INTO MONITORING WELL 1349MW103 ON 20 APRIL 2003.



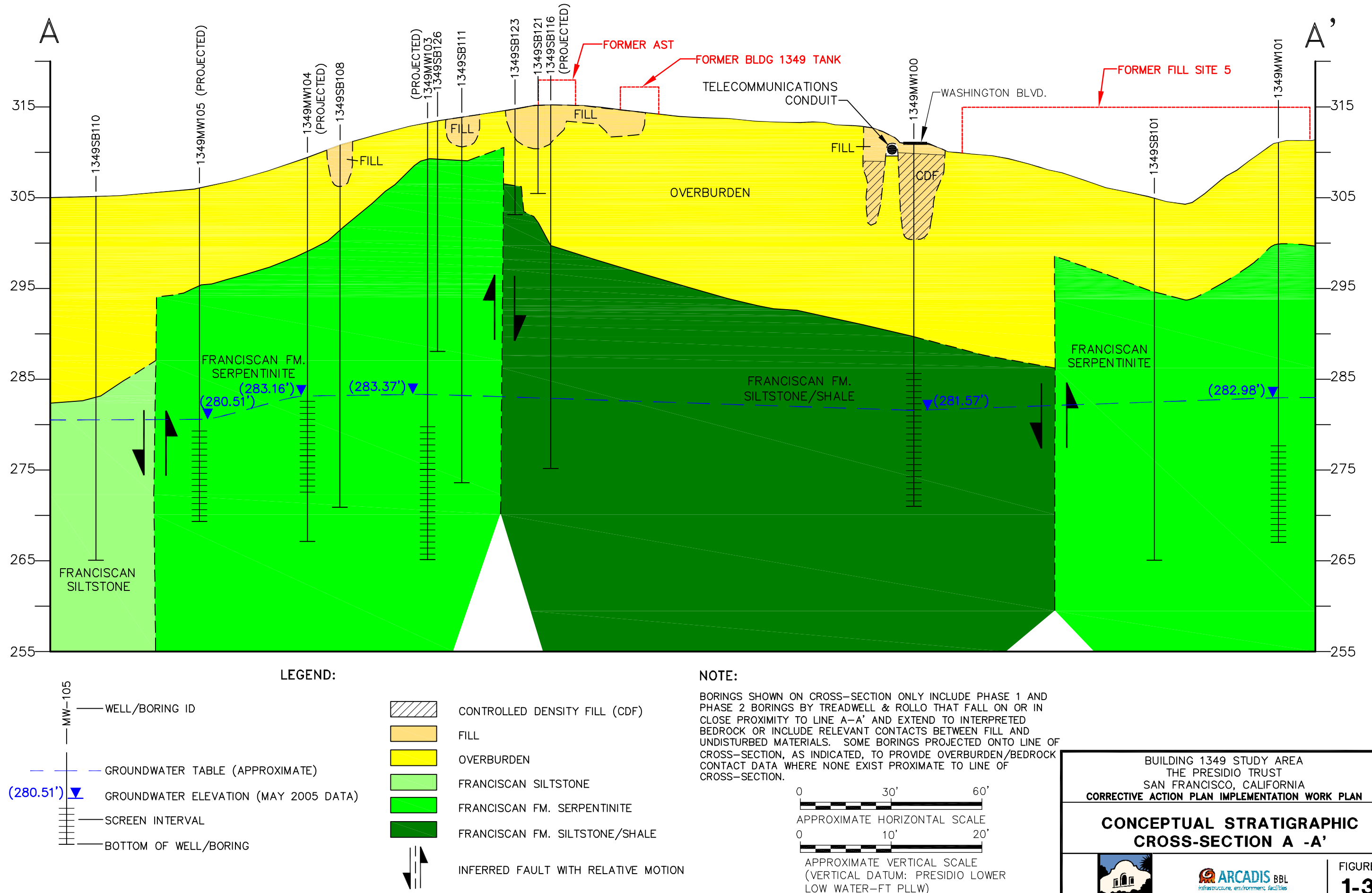
- LEGEND:
- | | | | | | |
|--|---------------------------------------|--|--|--|--|
| | GROUNDWATER MONITORING WELL | | TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL : 5 FT) | | FORMER PIPE |
| | FORMER ABOVEGROUND STORAGE TANK (AST) | | TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL : 1 FT) | | FORMER FDS PIPELINE TO BUILDING 1773 |
| | FORMER BUILDING 1349 TANK | | APPROXIMATE LINE OF CROSS SECTION FOR FIGURE 1-3 | | FDS TRENCH EXCAVATION |
| | FORMER SECONDARY CONTAINMENT | | FORMER FILL SITE 5 EXCAVATION BOUNDARY | | FORMER BUILDING 1349 REMEDIAL EXCAVATION AREA (1995) |
| | | | INFERRED FAULT | | FORMER FDS REMEDIAL EXCAVATIONS (1996-1997) |
| | | | COMMUNICATIONS CONDUIT | | BUILDING AND NUMBER |

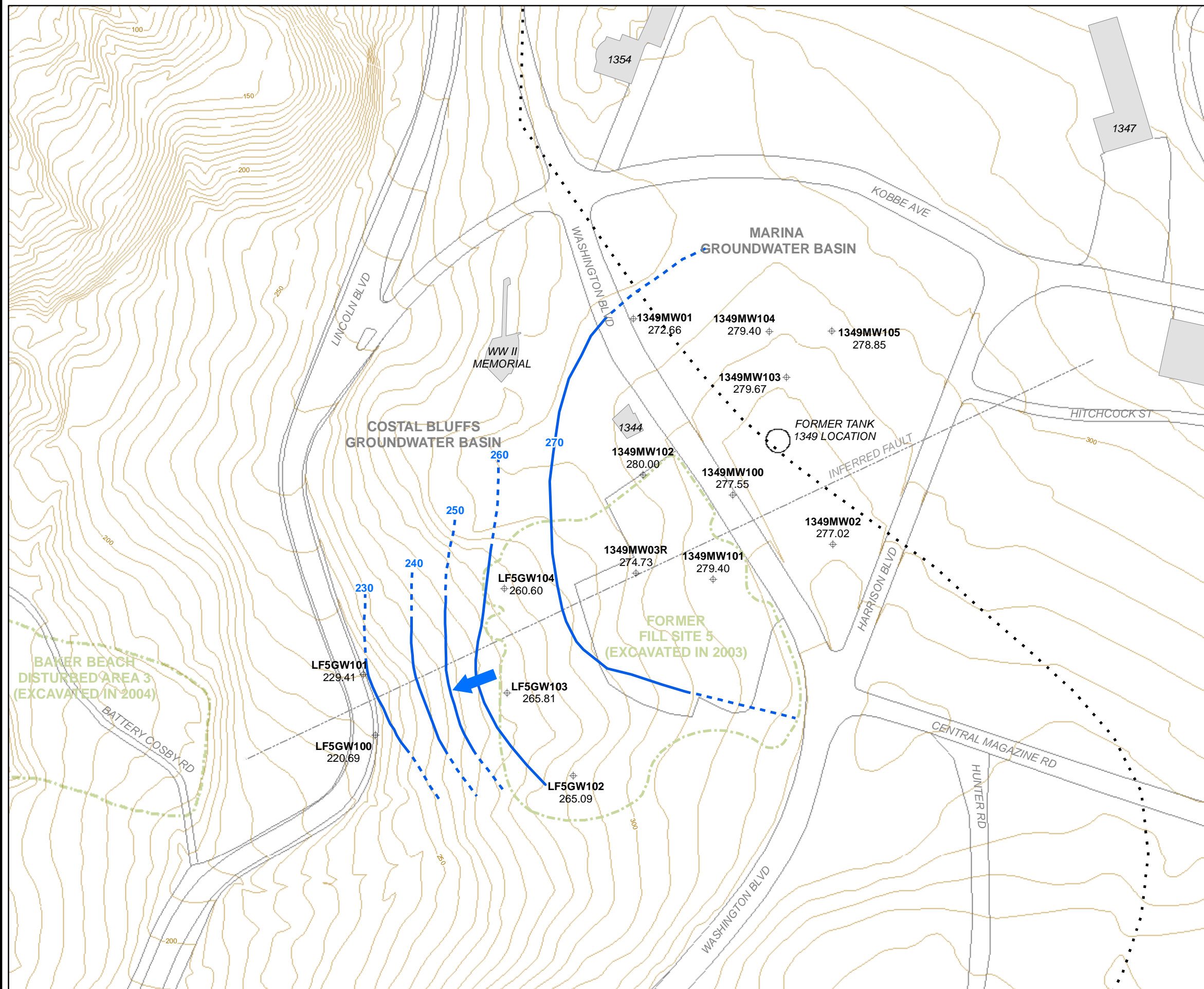
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THE PRESIDIO TRUST
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**CORRECTIVE ACTION PLAN
IMPLEMENTATION WORK PLAN**

SITE MAP



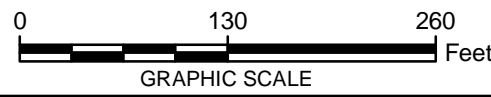
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- LEGEND:
- 1349MW02 276.19
⊕ GROUNDWATER MONITORING WELL
MAY 2004 GROUNDWATER ELEVATION
 - ➡ APPROXIMATE DIRECTION OF
GROUNDWATER FLOW
 - GROUNDWATER ELEVATION CONTOUR
(CONTOUR INTERVAL: 10 FT)
(DASHED WHERE INFERRED)
 - - - - - FORMER REMEDIATION SITE
EXCAVATION BOUNDARY
 - ⋯ GROUNDWATER BASIN BOUNDARY
 - - - - - INFERRED FAULT
 - TOPOGRAPHIC CONTOURS
(CONTOUR INTERVAL : 5 FT)
 - 1344 BUILDING AND NUMBER

- NOTES:
1. GROUNDWATER ELEVATION DATA COLLECTED MAY 2004.
 2. BASE MAP DATA OBTAINED FROM: DRAFT SITE INVESTIGATION REPORT, TREADWELL & ROLLO, OCTOBER 2003.
 3. LOCATION OF INFERRED FAULT FROM REVISED FEASIBILITY STUDY MAIN INSTALLATION SITES (EKI, 2003).
 4. HORIZONTAL DATUM: NAD27, CA STATE PLANE COORDINATES, ZONE 3, FEET; VERTICAL DATUM: (TOPOGRAPHY) NORTH AMERICAN VERTICAL DATUM, NAVD88 (GROUNDWATER) PRESIDIO LOWER LOW WATER (FT. PLLW).

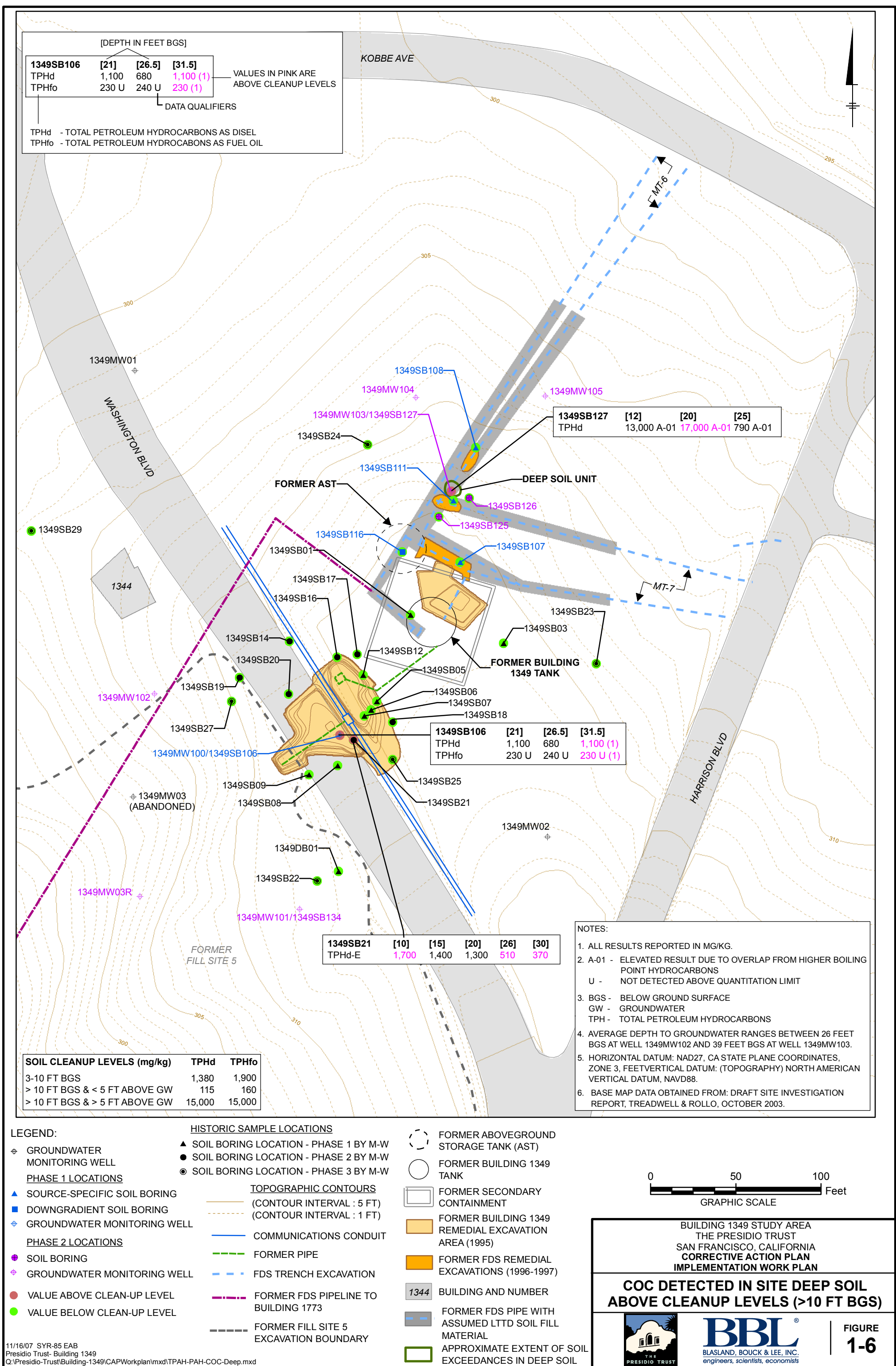


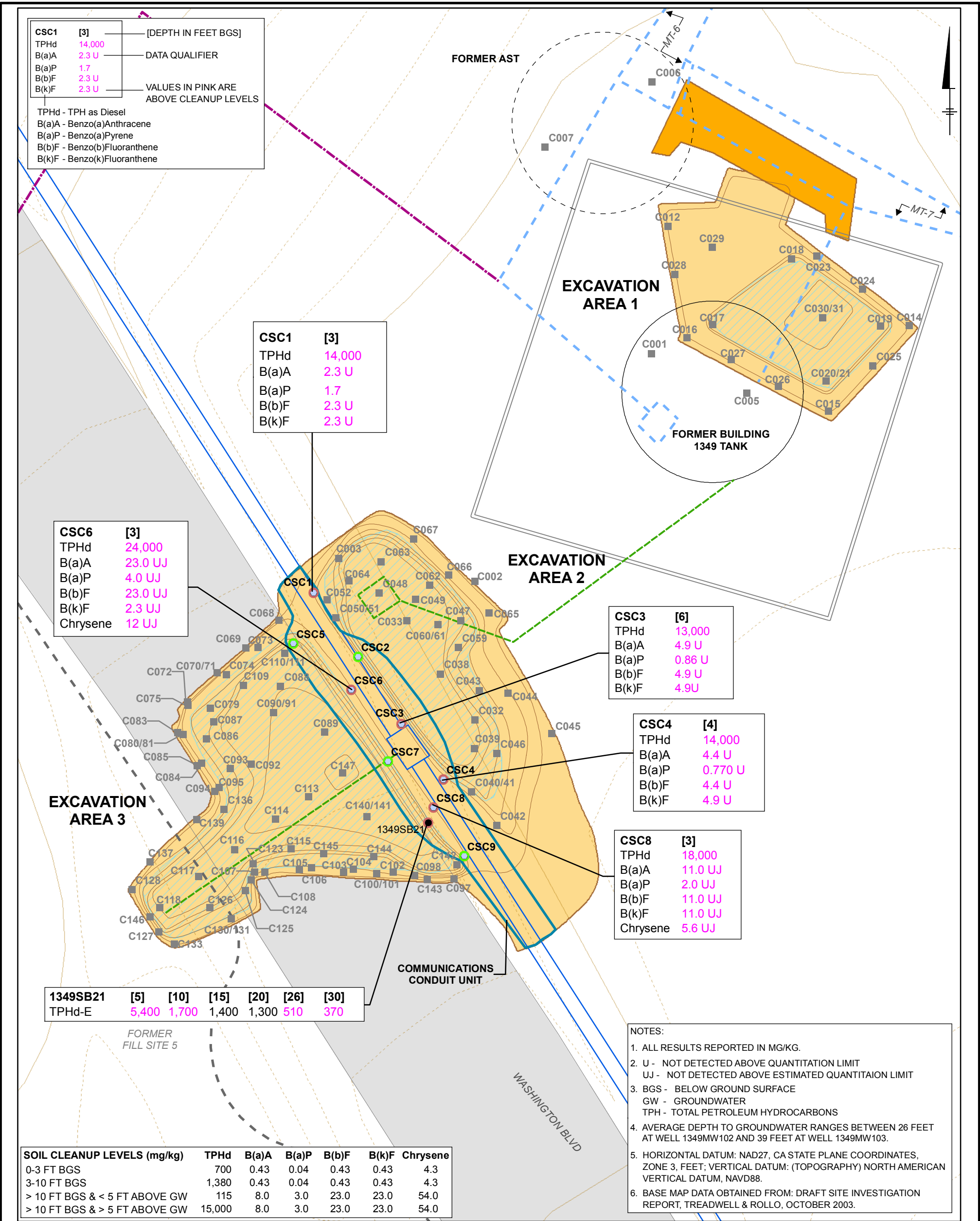
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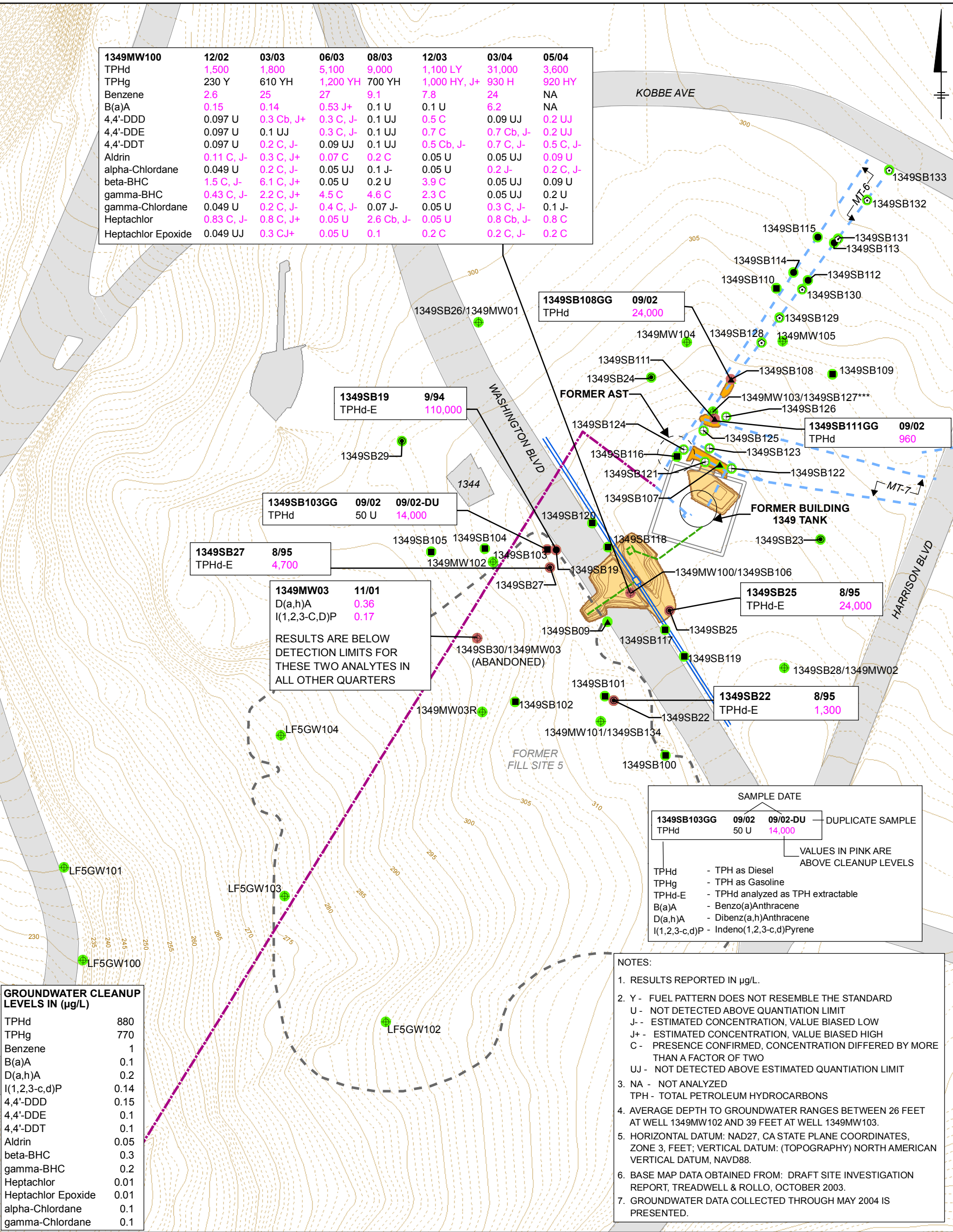
**GROUNDWATER ELEVATION
CONTOUR MAP**

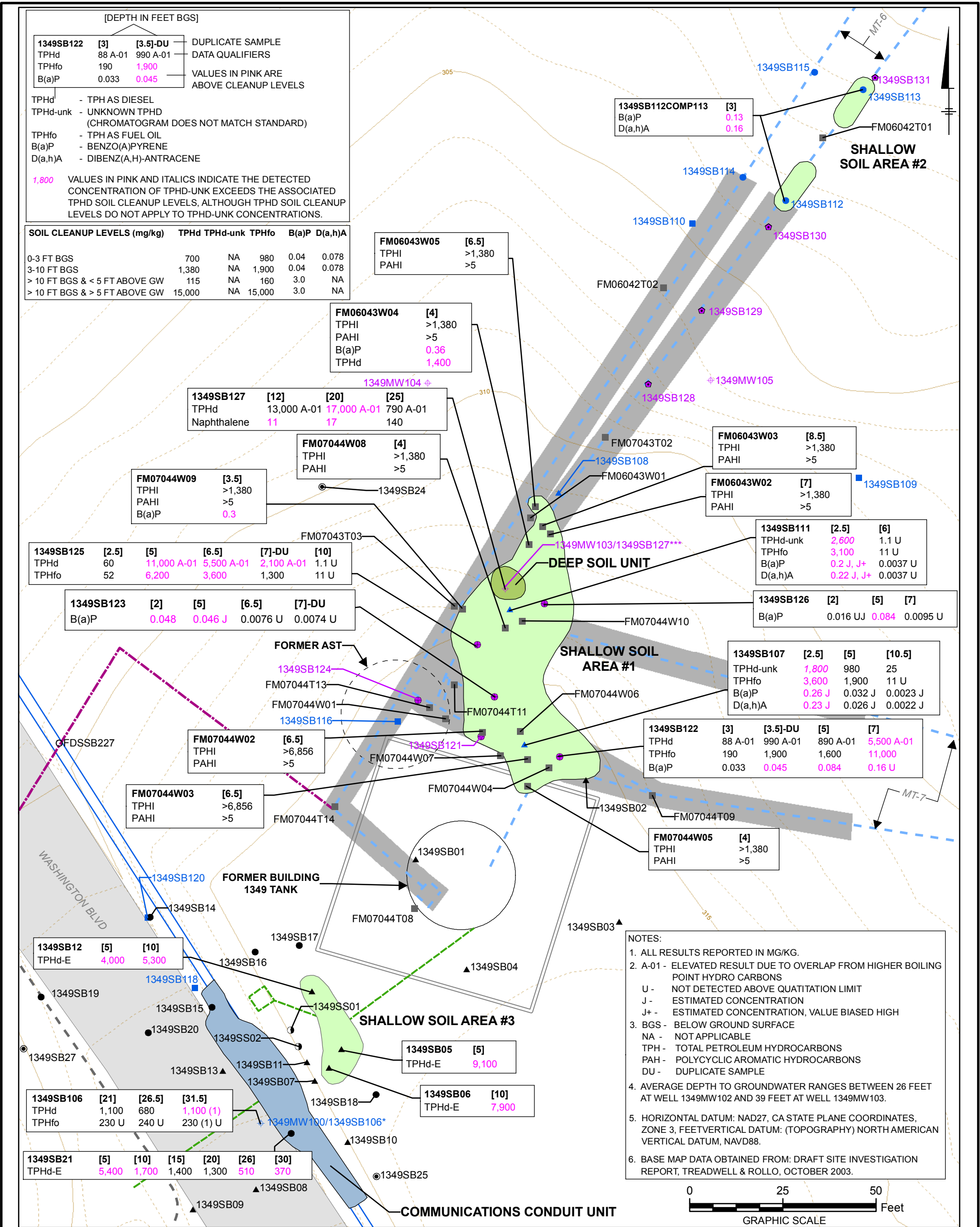


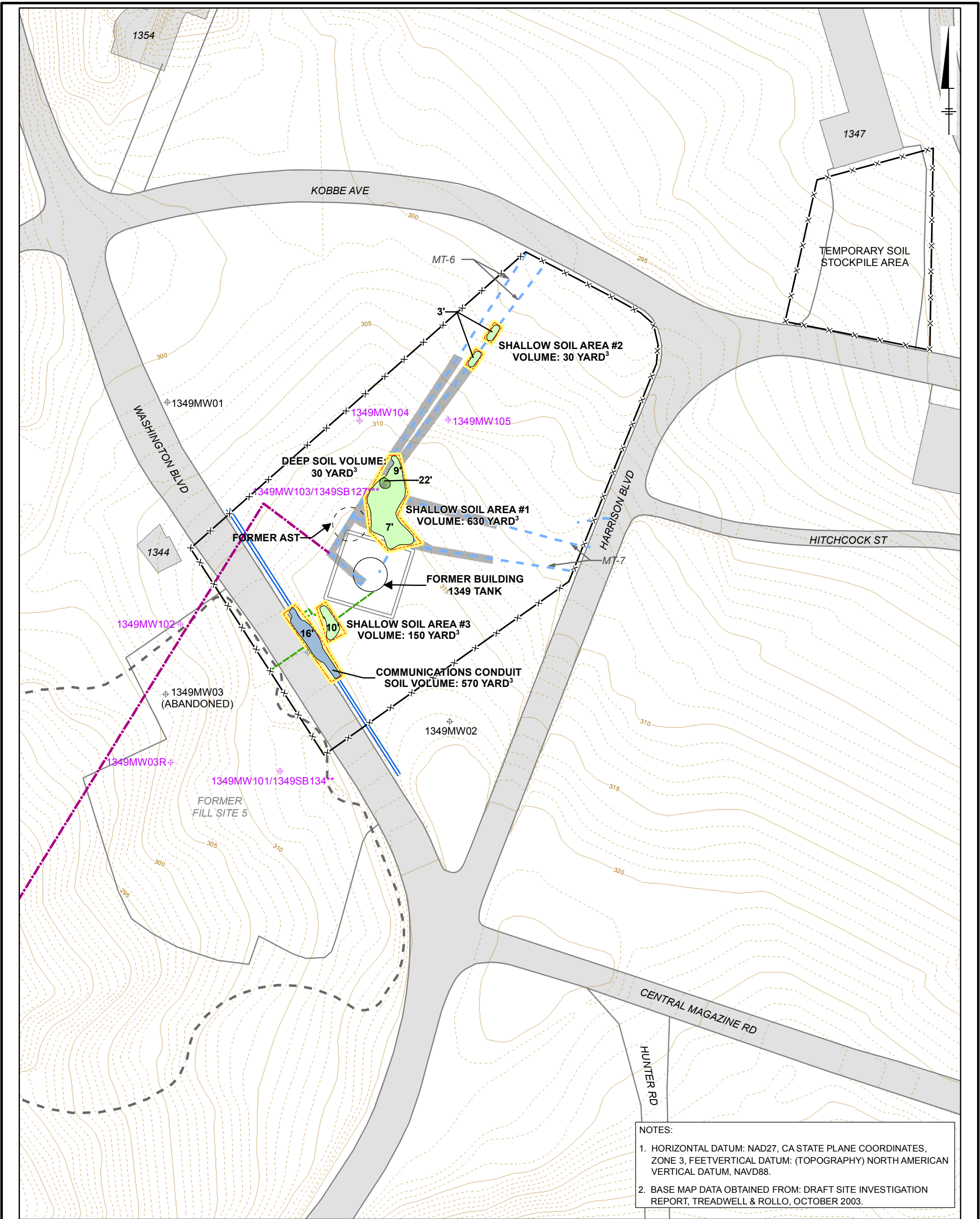
FIGURE
1-4







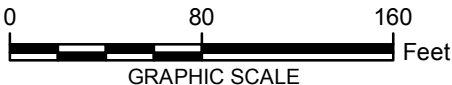




NOTES:

1. HORIZONTAL DATUM: NAD27, CA STATE PLANE COORDINATES, ZONE 3, FEETVERTICAL DATUM: (TOPOGRAPHY) NORTH AMERICAN VERTICAL DATUM, NAVD88.
2. BASE MAP DATA OBTAINED FROM: DRAFT SITE INVESTIGATION REPORT, TREADWELL & ROLLO, OCTOBER 2003.

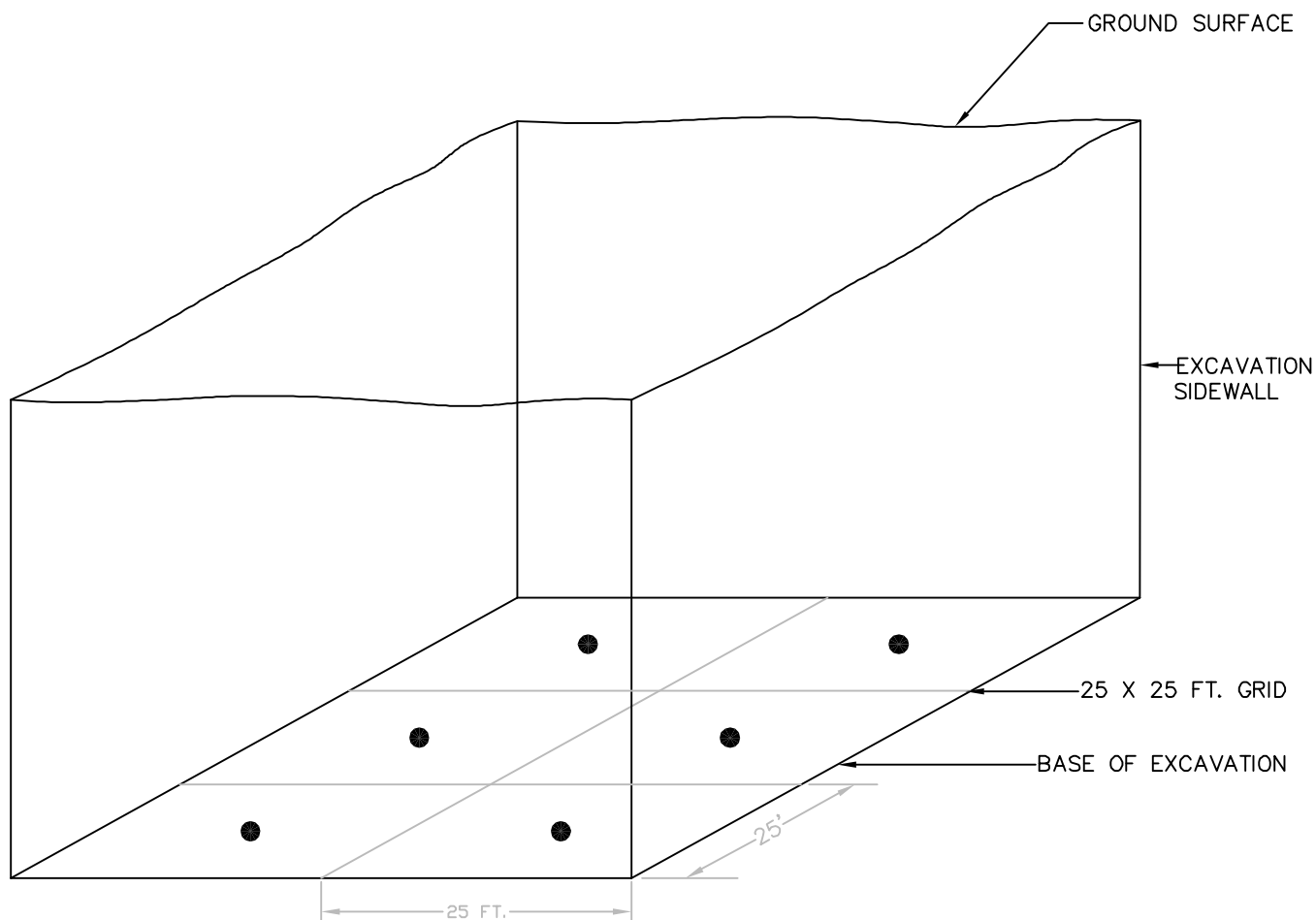
- LEGEND:
- | | | | | | |
|--|---|--|---|--|--|
| | PREVIOUSLY INSTALLED GROUNDWATER MONITORING WELL | | BUILDING AND NUMBER | | COMMUNICATIONS CONDUIT |
| | PHASE 1 GROUNDWATER MONITORING WELL | | APPROXIMATE EXTENT OF SOIL EXCEEDANCES BENEATH COMMUNICATIONS CONDUIT | | FORMER PIPE |
| | PHASE 2 GROUNDWATER MONITORING WELL | | FORMER FDS PIPE WITH ASSUMED LTDD SOIL FILL MATERIAL | | FDS TRENCH EXCAVATION |
| | APPROXIMATE EXTENT OF SOIL EXCEEDANCES IN DEEP SOIL | | FORMER ABOVEGROUND STORAGE TANK (AST) | | FORMER FDS PIPELINE TO BUILDING 1773 |
| | APPROXIMATE EXTENT OF SOIL EXCEEDANCES IN SHALLOW SOIL | | FORMER BUILDING 1349 TANK | | FORMER FILL SITE 5 EXCAVATION BOUNDARY |
| | PROPOSED SOIL EXCAVATION AREAS WITH TARGET MINIMUM EXCAVATION DEPTHS (FEET) | | FORMER SECONDARY CONTAINMENT | | PROPOSED TEMPORARY CHAIN-LINK FENCE WITH WIND SCREEN |
| | | | | | TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL : 5 FT) |
| | | | | | (CONTOUR INTERVAL : 1 FT) |



BUILDING 1349 STUDY AREA
THE PRESIDIO TRUST
SAN FRANCISCO, CALIFORNIA
**CORRECTIVE ACTION PLAN
IMPLEMENTATION WORK PLAN**

PROPOSED SOIL EXCAVATION AREAS

FIGURE 3-1



LEGEND:

- PROPOSED BOTTOM CONFIRMATION SAMPLE

NOTES:

1. ONE BOTTOM CONFIRMATION SAMPLE WILL BE COLLECTED EVERY 625 SQUARE FEET. A MINIMUM OF ONE SAMPLE WILL BE COLLECTED FROM EACH EXCAVATION BOTTOM.
2. ADDITIONAL SAMPLES WILL BE COLLECTED IF FIELD OBSERVATIONS INDICATE EVIDENCE OF RESIDUAL COC IMPACTS SUCH AS ELEVATED PID READINGS AND SOIL STAINING.

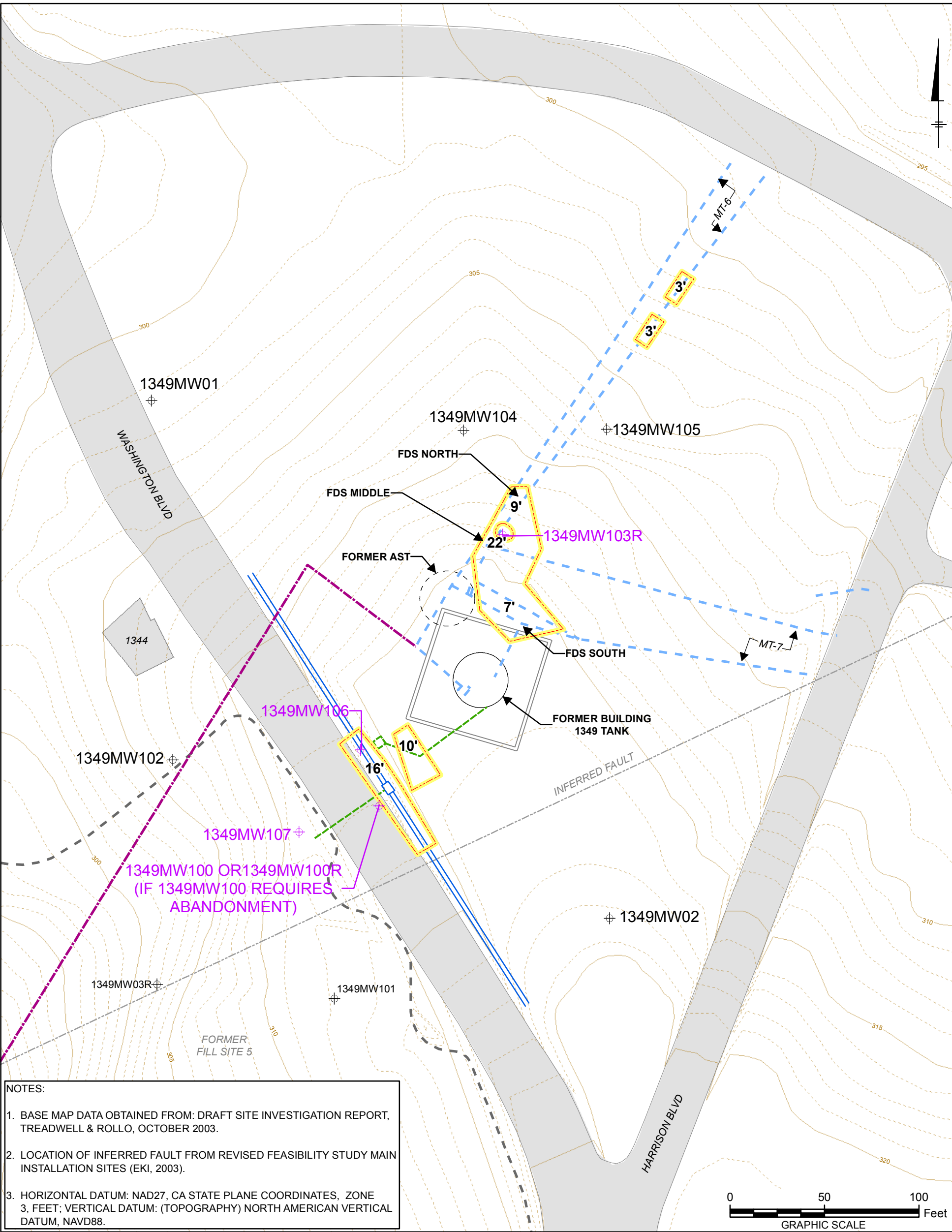
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 SAN FRANCISCO, CALIFORNIA
 CORRECTIVE ACTION PLAN IMPLEMENTATION WORK PLAN

PROPOSED BOTTOM CONFIRMATION SAMPLE LOCATIONS



ARCADIS BBL
 infrastructure. environment. facilities

FIGURE
3-3



NOTES:

1. BASE MAP DATA OBTAINED FROM: DRAFT SITE INVESTIGATION REPORT, TREADWELL & ROLLO, OCTOBER 2003.

2. LOCATION OF INFERRED FAULT FROM REVISED FEASIBILITY STUDY MAIN INSTALLATION SITES (EKI, 2003).

3. HORIZONTAL DATUM: NAD27, CA STATE PLANE COORDINATES, ZONE 3, FEET; VERTICAL DATUM: (TOPOGRAPHY) NORTH AMERICAN VERTICAL DATUM, NAVD88.

LEGEND:

- ⊕ PROPOSED GROUNDWATER MONITORING WELL

⊕ PREVIOUSLY INSTALLED GROUNDWATER MONITORING WELL

TOPOGRAPHIC CONTOURS

— (CONTOUR INTERVAL : 5 FT)

- - - (CONTOUR INTERVAL : 1 FT)
- - - FORMER FILL SITE 5 EXCAVATION BOUNDARY

- - - INFERRED FAULT

— COMMUNICATIONS CONDUIT

- - - FORMER PIPE

- - - FORMER FDS PIPELINE TO BUILDING 1773

- - - FDS TRENCH EXCAVATION
- ⊕ FORMER ABOVEGROUND STORAGE TANK (AST)

○ FORMER BUILDING 1349 TANK

□ FORMER SECONDARY CONTAINMENT

1344 BUILDING AND NUMBER

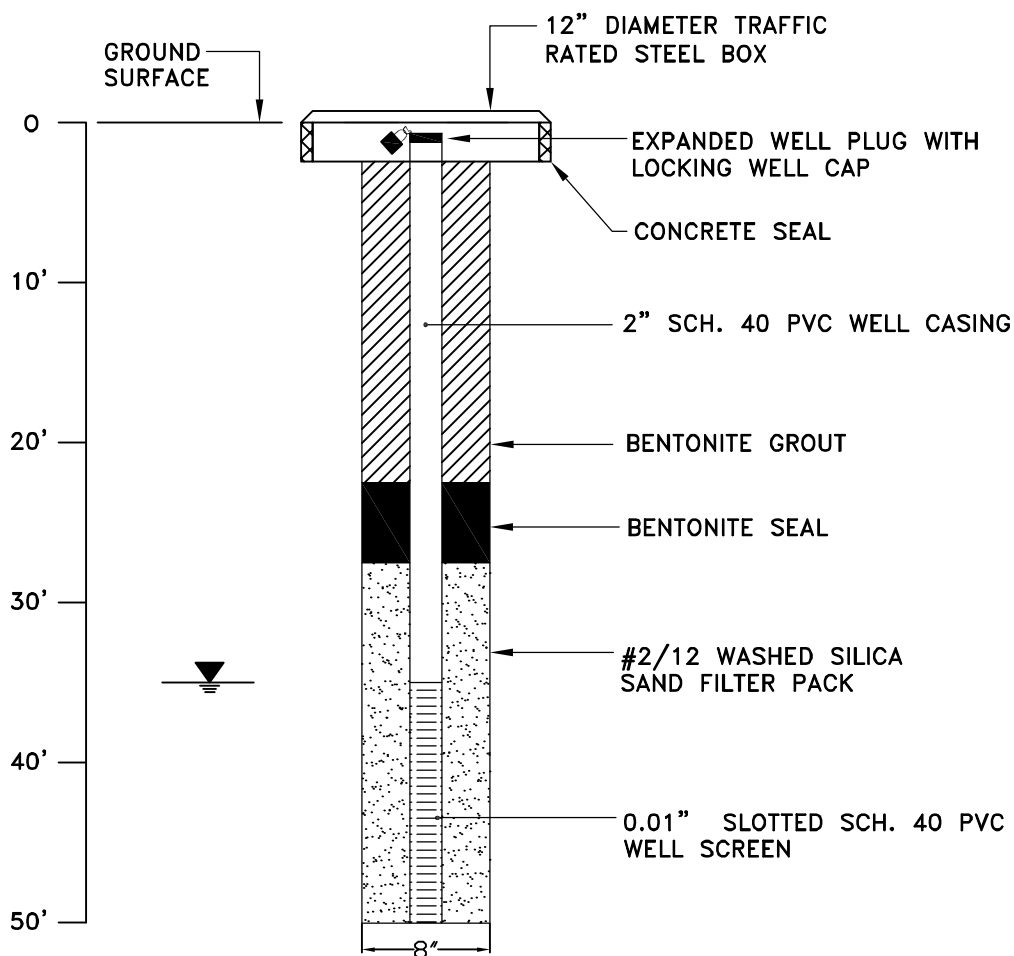
7' PROPOSED SOIL EXCAVATION AREAS WITH TARGET MINIMUM EXCAVATION DEPTHS (FEET)

BUILDING 1349 STUDY AREA
THE PRESIDIO TRUST
SAN FRANCISCO, CALIFORNIA
CORRECTIVE ACTION PLAN
IMPLEMENTATION WORK PLAN

PROPOSED GROUNDWATER MONITORING NETWORK



FIGURE 3-4



LEGEND:



APPROXIMATE GROUNDWATER
TABLE LEVEL

NOTES:

1. CONSTRUCTION DETAILS MAY BE MODIFIED BASED ON FIELD OBSERVATION.
2. WELLS WILL BE SCREENED ACROSS GROUNDWATER LEVEL, WITH THE EXCEPTION OF REPLACEMENT WELL 1349MW103R (AND POTENTIALLY 1349MW100R). REPLACEMENT WELLS WILL BE CONSTRUCTED WITH THE SAME WELL SCREEN INTERVALS AS ORIGINALS.



HORIZONTAL SCALE: 1" = 1'
VERTICAL SCALE: 1" = 12'

BUILDING 1349 STUDY AREA
THE PRESIDIO TRUST
SAN FRANCISCO, CALIFORNIA
CORRECTIVE ACTION PLAN IMPLEMENTATION WORK PLAN

TYPICAL WELL CONSTRUCTION DETAILS



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FIGURE
3-5

Figure 3-6
Implementation Schedule
Building 1349 Study Area
Presidio Trust
San Francisco, California

ID	Task	Duration	Start	Finish	2007												2008			
					May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	
1	SOIL REMEDIAL UNITS	283 days	Jun 11 '07	Jul 9 '08																
2	Pre-Remedial Action Activities	85 days	Aug 6 '07	Nov 30 '07																
3	Corrective Action Plan Implementation Work Plan	81 days	Aug 6 '07	Nov 26 '07																
4	Submit Draft Final CAP Work Plan	0 days	Aug 6 '07	Aug 6 '07																
5	Stakeholder Review of Draft Final CAP Work Plan	30 days	Aug 7 '07	Sep 17 '07																
6	Submit Final CAP Work Plan to RWQCB	5 days	Sep 18 '07	Sep 24 '07																
7	RWQCB Review of Final CAP Work Plan	45 days	Sep 25 '07	Nov 26 '07																
8	Approval of Final CAP Work Plan	0 days	Nov 26 '07	Nov 26 '07																
9	Contractor Bid Plans and Specifications	85 days	Aug 6 '07	Nov 30 '07																
10	Finalize Bid Plans and Specifications	9 days	Aug 6 '07	Aug 16 '07																
11	Contractor Bidding Period	20 days	Aug 17 '07	Sep 13 '07																
12	Select Contractor and Execution of Contract	10 days	Sep 14 '07	Sep 27 '07																
13	Submittal Preparation by Contractor	20 days	Oct 26 '07	Nov 22 '07																
14	Trust Review of Contractor Submittals	4 days	Nov 23 '07	Nov 28 '07																
15	Contractor Finalizes Submittals	2 days	Nov 29 '07	Nov 30 '07																
16	Corrective Action	183 days	Jun 11 '07	Feb 20 '08																
17	Presidio Trust Vegetation Management Site Preperation	55 days	Jun 11 '07	Aug 24 '07																
18	Contractor Mobilization/Site Prep/Well Abandonment	5 days	Dec 3 '07	Dec 7 '07																
19	Excavation Telecommunication Corridor Soil RU	10 days	Dec 10 '07	Dec 21 '07																
20	Excavation Shallow Soil RUs - Area 1, 2, and 3	12 days	Dec 24 '07	Jan 8 '08																
21	Excavation Deep Soil RU	16 days	Jan 9 '08	Jan 30 '08																
22	Off-Loading of Stockpiled Material	5 days	Dec 24 '07	Dec 28 '07																
23	Backfilling and Soil Compaction	28 days	Dec 24 '07	Jan 30 '08																
24	Site Restoration/Monitoring Well Installation and Development	10 days	Jan 31 '08	Feb 13 '08																
25	Site Cleanup/Demobilization	5 days	Feb 14 '08	Feb 20 '08																
26	Post-Corrective Action Activities	100 days	Feb 21 '08	Jul 9 '08																
27	1st Quarterly Groundwater Sampling - Post Corrective Action	3 days	Mar 3 '08	Mar 5 '08																
28	Receipt of Waste Manifests	40 days	Feb 21 '08	Apr 16 '08																
29	Preparation of CAP Implementation Report	90 days	Feb 21 '08	Jun 25 '08																
30	Stakeholder Review of CAP Implementation Report	10 days	Jun 26 '08	Jul 9 '08																
31	Submit CAP Implementation Report to RWQCB	0 days	Jul 9 '08	Jul 9 '08																

Appendix A

Dust and Perimeter Air Monitoring Plan

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1. Introduction

This Dust Control and Perimeter Air Monitoring Plan has been prepared for corrective action activities at the Building 1349 Study Area at the Presidio of San Francisco (Presidio), San Francisco, California (Study Area or Site). Figures 1-1 and 1-2 of the Corrective Action Plan Implementation Work Plan (CAP Work Plan) present a Site Location Map and Site Map for the Study Area. These activities will be preformed on behalf of the Presidio Trust (Trust).

This Dust Control and Perimeter Air Monitoring Plan is a working document that will be updated as activities are further defined or modified, as necessary. The work performed under this Dust Control and Perimeter Air Monitoring Plan for the Study Area will also be performed in accordance with the following plans.

- CAP Work Plan;
- Site Health and Safety Plan (HASP); and
- Transportation and Traffic Control Plan.

1.1 Purpose and Scope

The purpose of this Dust Control and Perimeter Air Monitoring Plan is to minimize and control the generation of dust during site corrective action activities. The scope of work for this corrective action is described in the CAP Work Plan for the Study Area.

Remedial construction contractors (Contractors) will implement the dust control measures program described in this plan during site corrective action activities in order to minimize and control the generation of dust. Effective dust control will reduce potential impacts on construction workers, and will simultaneously control nuisance dust and dust containing chemicals from migrating outside of the Site to surrounding populations. Dust control measures will minimize dust that may be generated from excavation, crushing, grading, loading of trucks, truck traffic, soil stockpiles, and equipment decontamination. Documentation of the performance of the dust monitoring program, including monitoring equipment records and equipment calibration will be completed by the Oversight Manager (BBL) as defined in the CAP Work Plan.

1.2 Study Area Background

The Site is located in the western portion of the Presidio, approximately 300 to 320 feet above the Presidio lower low water datum of 1907 (PLLW), and sits on a topographic high point on the boundary between the Marina Groundwater Basin and the Coastal Bluffs Groundwater Basin. Former Fill Site 5 and the western edge of Washington Boulevard are located to the west of the Study Area. Kobbe Avenue and Harrison Boulevard bound the Site to the north and east, respectively (Figure 1-2 of CAP Work Plan). Former Fill Site 5 is located to the west of the Study Area and Former Landfill 4 is located to the east-southeast.

The Building 1349 location was originally occupied by an above-ground storage tank (AST) that was built in 1906 in conjunction with the Presidio-Wide Fuel Distribution System (FDS). The AST was used to store fuel-heating oil that was distributed throughout the Presidio using the former FDS. The AST was approximately 100,000 gallons. The AST was replaced by Building 1349 in the early 1950s. Figure 1-2 identifies the location of the former AST and associated FDS piping. The FDS was decommissioned in sections beginning in the 1940s and ending in the early 1960s.

Building 1349 was a 100,000-gallon steel AST built in the 1950s (identified as Former Building 1349 Tank on Figure 1-2). The AST (Building 1349) was used to store fuel oil and then diesel fuel which was off-loaded to tanker trucks for transportation to various locations in the Presidio.

The United States Army Corp of Engineers (USACE) retained International Technology Corporation (IT) to perform the closure of Building 1349 in 1995. Closure activities occurred in October and November 1995 and included removing Building 1349 and its associated piping and excavating fuel-contaminated soil associated with former fueling operations at the Study Area. IT also conducted an FDS pipeline removal and abandonment project beginning in 1996 and removed the FDS pipelines within the Study Area (IT, 1999).

2. Dust Control Procedures

The dust control measures that may be implemented during construction activities are presented below. Mandatory dust control measures identified below correspond to the PM₁₀ control measures recommended by the following:

- California Environmental Quality Act Guidelines by the Bay Area Air Quality Management District (BAAQMD);
- Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations (ATCMs) in the California Code of Regulations, Title 17, Section 93105; and
- Stormwater Best Management Practice Handbook for Construction by the California Stormwater Quality Association (CASQA).

These dust control guidelines are to be implemented during construction activities regardless of whether constituents of concern are present in the soil. Some of the dust control measures recommended by the BAAQMD and CASQA are consistent with measures that will be implemented to control off-site storm water runoff (CAP Work Plan, Section 3.2.1.4). Additional Best Management Practices (BMPs) to control dust generation were derived from the CASQA Stormwater Best Management Practice Handbook for Construction (Section 2.2). As noted in the CAP Work Plan, due to the presence of naturally-occurring asbestos (NOA) in areas of serpentinite rocks and soil, best available dust control measures will be employed to reduce and control dust emission from construction activities to satisfy Asbestos Airborne Toxic Control Measure (ATCM) requirements for Construction and Grading Operations in accordance with Section 93105 (e) 1 (A-F) of the California Code of Regulations (CCR). Because the anticipated disturbed excavation area is less than one acre, an Asbestos Dust Mitigation Plan and Application for construction and excavation activities will not be required to be submitted to the Bay Area Air Quality Management District (BAAQMD) Section 93105 (e) 2 (A-B). Best available dust control measures dust control measures for construction activities at the site as described herein satisfies the requirements of Section 93105 (e) 1 (A-F).

2.1 Mandatory Dust Control Measures

The following dust control measures must be implemented during the corrective action project:

- Track-Out Prevention and Control Measures
 - Sweep street daily (with water sweepers) if visible soil material is carried onto public streets.
 - Install knock-off plates to be used for hauling trucks and other equipment (approximate area shown on Figure 1-2 of the Transportation Plan).
 - Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Stockpile Management
 - Enclose, cover, and water as necessary. The performance standard applicable to all stockpiled soils is to prevent visible dust plumes from migrating outside the Project Boundaries. Water shall be used

to mitigate dust generation during the creation, movement, or use of the soil stockpiles. Overwatering, which could result in excessive runoff, must be avoided. Stockpiles will be placed on top of a 10-mil HDPE poly sheeting layer on existing ground surface.

- For inactive stockpiles, dust will be controlled either through the use of a cover. The cover will consist of either anchored plastic sheeting (10-mil HDPE poly sheeting) or an equivalent cover. The method of covering will be determined based on anticipated time the stockpiles will be in place, weather conditions, and other practical factors such as the size of the stockpiles.
- Install windscreen on Site perimeter fencing, including stockpile area.

- On-Site Traffic

- Limit traffic speeds on unpaved roads to 15 miles per hour (mph) or less.
- Apply water three times per day (or as necessary) on all unpaved access roads, parking areas and staging areas at construction sites.
- Sweep daily with wet sweeping or a HEPA filter equipped vacuum device all paved access routes, parking areas and staging areas.
- Security gates shall be installed at the project entrances to prevent the entry of unauthorized vehicles during non-working hours and weekends.

- Excavation and Grading Activities

- Water all active construction areas at least twice a day or as necessary to prevent visible dust plumes from migrating outside of the Study Area. Construction areas shall be adequately wetted to satisfy the test in subsection 93105(h)(5)(B) of the ATCM.
- Water shall be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution.
- All distribution equipment shall be equipped with a positive means of shutoff.
- Unless water is applied by means of pipelines, at least one mobile unit (water truck) must be available at all times to apply water to the project area.
- Mist or spray water on soils during excavation activities.
- Install windscreen on Site perimeter fencing.
- Thoroughly decontaminate all equipment utilized in excavation and grading activities prior to removing from Site.

- Off-Site Transport

- Ensure that no spillage can occur from holes or openings in truck cargo compartments.

-
- Mist or spray water on soil immediately prior to or while loading transportation vehicles, as needed.
 - Minimize drop heights while loading transportation vehicles.
 - Use tarpaulins or other effective covers for trucks carrying soils that travel on streets.
 - Post Construction Stabilization
 - Perform site restoration activities as outlined in the CAP Work Plan, which includes restoring Historic Forest Zones by the Trust.

2.2 Additional BMPs for Dust Control

Additional dust control measures may be implemented by the Contractor, as necessary. Optional dust control measures will be implemented by the contractor on a case-by-case basis based on wind conditions at the Site and the results of the Dust Monitoring Program outlined in Section 3.0. Additional control measures that may be implemented to reduce dust include:

- Minimize the impact of dust by anticipating the direction of prevailing winds and adjusting activities to current weather conditions.
- Installing wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site. If wet methods are used to wash off tires, the access pad will be graded towards a collection sump to allow decontamination water to be captured and routed to a storage tank.
- Mist or spray water during excavation activities.
- Suspending excavation and grading activities when winds (instantaneous gusts) exceed 25 mph.
- Schedule potential dust generating activities during periods that would least impact potential receptors.
- Limiting the area subject to excavation, grading and other construction activities at any one time.

2.3 Documentation of Dust Control Measures

Contractors will keep daily logs of all dust control measures that are implemented throughout the course of the day. Logs will be included in the Corrective Action Implementation Report (Section 3.6.3 of the CAP Work Plan) and will become part of the administrative record.

3. Dust Monitoring Program

In conjunction with dust control measures, Oversight Manager and Contractor will follow this Dust and Asbestos Monitoring Program (Program) during remedial construction activities to prevent adverse impacts to off-site populations by the construction activities. Off-site populations refer to receptors outside of the boundaries of the Study Area. Potential exposures to the on-site construction worker are discussed in the Site HASP.

The action level for particulate matter less than 10 microns (PM_{10}) will be 1.0 mg/m^3 . This action level will be a time weighted average measured over eight hours. The Occupational Health and Safety Administration's permissible exposure limit (PEL) for respirable particulate matter less than PM_{10} for an eight hour averaging time is 5 mg/m^3 . The action level of 1 mg/m^3 is used as a more conservative measure against hazards associated with excessive inhalation of dust and airborne contaminants.

The objective of the Program is to collect data that is reflective of the levels of dust generated during remedial construction activities so that additional dust suppression measures can be implemented, if necessary, to reduce potential impacts to nearby populations. The Program will consist of real-time monitoring for PM_{10} concentrations, as discussed in the following sections. The Program must be implemented during the period when remedial activities will involve dust-generating activities at the Site. Dust-generating activities are defined as activities for which dust monitoring may be necessary, and includes demolition, grading, excavation, trenching, soil stockpiling, backfilling, handling and movement of soil, vehicular traffic on an unpaved surface, or dry equipment decontamination. However, once the remedial activities reach a point that dust-generating activities are no longer occurring at the Site, dust monitoring will not be necessary. Compliance with the Program will be the responsibility of Oversight Manager. Construction personnel will be periodically briefed in the field about the substance of the Program and will inform the Contractor if the dust levels exceed the criteria.

The Program will consist of the following two components:

- Monitoring for PM_{10} within the project boundaries as close to the dust-generating activity as possible; and
- Monitoring for PM_{10} at specified monitoring stations at the project boundary;

3.1 Monitoring of Dust-Generating Activities

During dust-generating activities, the following elements of the Program shall be implemented within the project boundaries. Dust monitoring will be completed in the Work Zone as close to the center of the dust-generating activity, as practicable.

3.1.1 Monitoring Equipment

Dust monitoring for PM_{10} will be conducted using a MIE PDR1000 particulate monitor (personal DataRAM) or equivalent. The personal DataRAM is a direct reading personal aerosol monitor which measures concentrations of airborne dust, smoke, mist, and fumes in real time. The particulate monitor measures airborne particulate concentrations ranging from 0.001 to 400 mg/m^3 . Particulates are detected ranging in size from 0.1 to 10 micrometers (μm). Dust monitoring equipment will be maintained and calibrated in accordance with the specific manufacturer's procedures. Preventive maintenance and repairs will be conducted in accordance with

the respective manufacturer's procedures. When applicable, only manufacturer-trained and/or authorized personnel will be allowed to perform instrument repairs or preventive maintenance.

If an instrument is found to be inoperative or suspected of giving erroneous readings, the instrument will immediately be removed from service and a replacement unit will be obtained. If the instrument is essential for safe operation during a specific activity, remedial action activities will cease until an appropriate replacement unit is obtained. The Oversight Manager will be responsible for ensuring a replacement unit is obtained and/or repairs are initiated on the defective equipment.

3.1.2 Sampling Frequency

There are two options available for sampling frequency that satisfies the objectives of the Program. Monitoring activities may include the following:

Option One

Sampling will occur during the first two days of a new operation involving dust-generating activities, as well as every day that a new dust-generating activity occurs on the Site. Samples will be collected by a site walker carrying the dust monitor once per hour for the duration of 10 minutes in the Work Zone. If the time-weighted average concentration in the Work Zone is less than 1.0 mg/m³ during these first two days, sampling will occur one day per week for the remainder of the dust-generating activity. If the 10-minute time-weighted average concentration exceeds 1.0 mg/m³ in any sampling events, then sampling will occur daily or until two successive daily sampling events occur with no exceedance of the 1.0 mg/m³ threshold.

Option Two

During the implementation of dust-generating activities, real-time direct reading air monitoring (MIE PDR1000) will be performed continuously to measure concentrations of airborne particulates in the Work Zone. The dust monitor will be set up in one location as discussed below. The monitor will be checked on an hourly basis to verify that the time-weighted average concentration is less than 1.0 mg/m³.

The selection of either option will be up to the discretion of the Oversight Manager at the beginning of the corrective action. Regardless of the option chosen, that option will continue to be used for the duration of the project.

3.1.3 Sampling Locations

Samples will be collected in the Work Zone as close to the center of the dust-generating activity as possible. In this way, samples will represent worst-case levels of dust to which the nearby populations could potentially be exposed. Monitoring typically should be collected from an approximate height of five feet above the ground surface. Sampling locations for each monitoring option are as follows. If Option One is chosen for sample frequency, Option One will also be chosen for the sample location.

Option One

The site walker should start as close to the dust-generating activity as possible. If the concentrations are approaching 1.0 mg/m³, the walker should move towards the downwind Site boundary and continue to take

measurements without interfering with the construction activities. Factors that will be taken into account when selecting the walker's route and destination will include the local wind direction, location of the dust generation, location of the nearest Site boundary, and the nearest off-site receptors. A demonstration that the levels within or directly downwind of the dust-generating activities are below 1.0 mg/m³ is sufficient documentation that levels off site are well below the threshold.

Option Two

The monitor should be stationed as close to the dust-generating activity as possible without interfering in the activity. When the monitor needs to be stationed at the edge of the dust-generating activity due to the nature of the dust-generating activity, the monitor should be placed on the downwind side of the Site. Unless site-specific data indicates the contrary, the downwind direction will be to the east-southeast of the dust generating activity. As with Option One, other factors should also be taken into account when locating the monitor, including the local wind direction, the location of the dust generation, the location of the nearest Site boundary and the nearest off-site receptors. During the course of the day, it may be necessary to relocate the dust monitor because conditions may change at the Site. A demonstration that the levels within or directly downwind of the dust-generating activities are below 1.0 mg/m³ is sufficient documentation that levels off site are well below the threshold.

3.1.4 Recording of Quantitative Measurements

All PM₁₀ data should be logged with a data recorder, downloaded from the Personal DataRAM 1000 or equivalent instrument, and kept on file at the construction site. Copies of these records will be included in the Corrective Action Implementation Report. If sampling is occurring periodically with a site walker (Option One), the data recording should be set at intervals of 30 seconds or less. If continuous monitoring is occurring (Option Two), data recording should be set at intervals not greater than 2 minutes. In addition, time-weighted averages should be recorded on the Work Zone Air Monitoring Log (Attachment A). Notes regarding the location of the monitors, dust generating activities, and nearby populations should also be recorded on the air monitoring log and in the field book. In addition, any recommended mitigation and follow-up measurements will also be recorded.

3.2 Monitoring at the Project Perimeter

During dust-generating activities, the following elements of the Program shall be implemented at the project perimeter.

3.2.1 Monitoring Equipment

Dust monitoring for PM₁₀ will also be conducted using a MIE PDR1000 particulate monitor (personal DataRAM) or equivalent. The personal DataRAM is a direct reading personal aerosol monitor which measures concentrations of airborne dust, smoke, mist, and fumes in real time. The particulate monitor measures airborne particulate concentrations ranging from 0.001 to 400 mg/m³. Particulates are detected ranging in size from 0.1 to 10 µm. Dust monitoring equipment will be maintained and calibrated in accordance with the specific manufacturer's procedures. Preventive maintenance and repairs will be conducted in accordance with the respective manufacturer's procedures. When applicable, only manufacturer-trained and/or authorized personnel will be allowed to perform instrument repairs or preventive maintenance.

If an instrument is found to be inoperative or suspected of giving erroneous readings, the instrument will immediately be removed from service and a replacement unit will be obtained. If the instrument is essential for safe operation during a specific activity, remedial action activities will cease until an appropriate replacement unit is obtained. The oversight consultant or other entity designated by the Trust will be responsible for ensuring a replacement unit is obtained and/or repairs are initiated on the defective equipment.

3.2.2 Sampling Frequency

Sampling will occur continuously during any dust-generating activity at both upwind and downwind boundaries of the Study Area. The monitor will be checked on an hourly basis. The downwind concentration of airborne particulates should be less than the 1.0 mg/m^3 threshold above background airborne particulate concentrations (upwind). If the background concentration on the upwind property boundary is 0.10 mg/m^3 , the downwind concentration must be less than 1.10 mg/m^3 . In addition, the boundary monitoring station will be checked immediately should the monitoring of dust-generating activities within the boundaries exceed the 1.0 mg/m^3 threshold above background or visible dust plumes be observed near the boundaries of the Study Area. Daily calibration data as well as instrument readings and time weighted averages will be recorded on air-monitoring logs or the field log book. All documentation and data will be included in the Corrective Action Implementation Report and will become part of the administrative record.

3.2.3 Sampling Locations

Potential locations of the nearest off-site receptors, locations of potential dust-generating activities, and local wind direction will be addressed when locating the dust monitoring stations. A background dust monitoring station will be placed upwind of dust-generating activities. A second dust monitoring station may also be necessary along the Site boundary downwind of dust-generating activities should the monitoring of dust-generating activities within the Site boundaries exceed the 0.050 mg/m^3 threshold above background or visible dust plumes are observed near the Site boundaries. The dust monitoring stations should be placed at a height of approximate five feet to six feet above the ground surface.

3.2.4 Recording of Quantitative Measurements

All PM_{10} data should be logged with a data recorder, downloaded from the Personal DataRAM 1000 or equivalent instrument, and kept on file at the construction site. Copies of these records will be included in the Corrective Action Implementation Report. In addition, time-weighted averages should be recorded on the Perimeter Air Monitoring Log (Attachment B). The data recording should be set at intervals not greater than 2 minutes. Notes regarding the location of the monitors, the dust generating activities, and the nearby populations should also be recorded in the field logbook. In addition, any recommended mitigation and follow-up measurements will also be recorded.

3.3 Sampling Personnel

The Oversight Manager will be responsible for air monitoring and may designate his field sampling personnel as an appropriate assistant or back up. The individual conducting the sampling should be an individual trained on the operation and handling of the sampling equipment to be used, per manufacturer instructions.

3.4 Criteria for Emissions Mitigation Activities

If the on-site, daily time-weighted average concentration exceeds 1.0 mg/m^3 , additional dust suppression measures as discussed in Section 2.2 shall be implemented for the next day, assuming the dust-generating activity continue the following day. Furthermore, additional dust suppression measures will be implemented if visible dust plumes are observed crossing the boundaries of the Study Area, regardless of the measured PM_{10} concentrations.

4. Action Levels

Based on historic analytical results, the primary constituents of concern for ambient air monitoring include arsenic, beryllium, copper, lead, mercury, vanadium, zinc, and polycyclic aromatic hydrocarbons (PAHs). Elevated concentrations of these compounds have been detected in soil at the Site. While additional volatile organic compounds, semi-volatile organic compounds, metals, and petroleum-related compounds have been detected in soil, detected concentrations are relatively low. Surrogate dust action levels were calculated for the following compounds due to the potential risks to health and safety associated with airborne concentrations of these compounds in dust. Additionally, specific action levels for ambient air quality have been developed for these compounds.

Office of Environmental Health Hazard Assessment (OEHHA) Reference Exposure Limits (RELs) were used to calculate surrogate dust action levels. Action levels were calculated as follows:

Action Level Calculation for Lead

Calculation of the Total Dust Action Level as a surrogate for lead is based upon the National Ambient Air Quality Standard (NAAQS). The NAAQS for lead is a quarterly emissions standard. Therefore, the average concentration of lead in soil was used in the action level calculation.

$$\text{Chemical Concentration in Air} = \left(\frac{\text{Total Dust}}{\text{Concentration in Air}} \right) \left(\frac{\text{Average Concentration}}{\text{of Lead}} \right) (\text{Conversion Factor})$$

$$\left(\frac{\text{mg Lead}}{\text{m}^3} \right) = \left(\frac{\text{mg Dust}}{\text{m}^3} \right) \left(\frac{\text{mg Lead}}{\text{kg soil}} \right) \left(\frac{1 \text{ kg soil}}{1 \times 10^6 \text{ mg soil}} \right)$$

$$\text{Action Level for Lead} = \left(\frac{1.5 \mu\text{g}}{\text{m}^3} \right) = \frac{0.0015 \text{ mg}}{\text{m}^3}$$

$$\frac{0.0015 \text{ mg}}{\text{m}^3} = \left(\frac{X \text{ mg Dust}}{\text{m}^3} \right) \left(\frac{20 \text{ mg Lead}}{\text{kg soil}} \right) \left(\frac{1 \text{ kg soil}}{1 \times 10^6 \text{ mg soil}} \right)$$

$$\left(\frac{X \text{ mg Dust}}{\text{m}^3} \right) = \frac{75 \text{ mg Total Dust}}{\text{m}^3}$$

Action Level Calculation for Arsenic

Calculation of the Total Dust Action Level as a surrogate for arsenic is based on Office of Environmental Health Hazard Assessment (OEHHA) Acute Reference Exposure Level (REL). The REL for arsenic is a four hour average. Therefore, the maximum concentrations of arsenic in soil were used in the action level calculations for the Site.

$$\text{Chemical Concentration in Air} = \left(\frac{\text{Total Dust}}{\text{Concentration in Air}} \right) \left(\frac{\text{Maximum Concentration}}{\text{of Arsenic}} \right) (\text{Conversion Factor})$$

$$\left(\frac{\text{mg Arsenic}}{\text{m}^3} \right) = \left(\frac{\text{mg Dust}}{\text{m}^3} \right) \left(\frac{\text{mg Arsenic}}{\text{kg soil}} \right) \left(\frac{1 \text{ kg soil}}{1 \times 10^6 \text{ mg soil}} \right)$$

$$\text{Action Level for Arsenic} = \left(\frac{0.19 \mu\text{g}}{\text{m}^3} \right) = \frac{0.00019 \text{ mg}}{\text{m}^3}$$

$$\frac{0.00019 \text{ mg}}{\text{m}^3} = \left(\frac{X \text{ mg Dust}}{\text{m}^3} \right) \left(\frac{25 \text{ mg Arsenic}}{\text{kg soil}} \right) \left(\frac{1 \text{ kg soil}}{1 \times 10^6 \text{ mg soil}} \right)$$

$$\left(\frac{X \text{ mg Dust}}{\text{m}^3} \right) = \frac{7.6 \text{ mg Total Dust}}{\text{m}^3}$$

Total Dust Action Level as surrogates for beryllium, copper, mercury, vanadium, and zinc were also calculated using OEHHA RELs. Maximum concentrations of these compounds were used in the action level calculations for the Site. Action levels were calculated using the above equations for each compound. The table below summarizes average and maximum detected concentrations, exposure limits, and calculated action levels for each compound:

Constituent	Maximum Soil Concentration (mg/kg)	Average Concentration (mg/kg)	OEHHA/ARB REL (mg/m ³)	Surrogate Dust Action Level (mg/m ³)
Arsenic	25	5.6	0.00019	7.6
Beryllium	2.3	1.1	0.000007	3.0
Copper	150	42	0.1	670
Lead	130	20	0.0015	75
Mercury	0.95	0.90	1.8	1900000
Vanadium	130	58	0.03	230
Zinc	210	80	0.035	170

Note: Exposure level for lead is based on EPA National Ambient Air Quality Standards (NAAQS).

Based on these reference exposure levels, exposure to the constituents of concern that may be attached to the suspended airborne particulates will not adversely impact human health if the daily average respirable dust levels at on-site receptor locations remained below 1.0 mg/m³. The dust action level of 1.0 mg/m³ is therefore protective for other airborne contaminants of concern.

5. Odor Control Procedures

Odor will be controlled by sequencing excavation of the petroleum hydrocarbon impacted soil in a manner that will result in limited areas of open excavation. Plastic sheeting will also be used to cover stockpiled soil for additional odor control.

6. References

Erler & Kalinowski, Inc. (EKI), 2002. *Development of Presidio-wide Cleanup Levels for Soil, Sediment, Groundwater, and Surface Water*. October.

IT, 1999. *Fuel Distribution System Closure Report, Presidio of San Francisco, California, Volumes 1 through 3*. May.

Treadwell & Rollo, 2003a. *Draft Site Investigation Report, Building 1349 Study Area, Presidio of San Francisco*. October.

Trust, 2002. *Presidio Trust Management Plan, Land Use Policies for Area B of the Presidio of San Francisco, California*. May.



Project	Site Location
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95	96
97	98
99	100

Project Number _____

Prepared by

Date _____

[illegible]

COMMENTS



PERIMETER AIR MONITORING LOG

Project _____ **Site Location** _____

Project Number _____

Prepared by _____ Date _____

[illegible]

COMMENTS

Appendix B

Transportation and Traffic Control Plan

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B1-2	Site Map
B5-1	Potential Hauling Routes - Inbound within the Presidio
B5-2	Potential Hauling Routes - Outbound within the Presidio

1. Introduction

This Transportation and Traffic Control Plan has been prepared by Blasland, Bouck & Lee, Inc. (BBL) on behalf of the Presidio Trust (Trust) to provide a description of transportation procedures for off-site disposal of excavated material for the Building 1349 Study Area at the Presidio of San Francisco (Presidio), San Francisco, California (Study Area or Site). The Transportation Plan for corrective action activities is consistent with and is a supplement to the corrective actions for soils described in the Final CAP (BBL, 2006) and the CAP Work Plan. Figures B1-1 and B1-2 present a Site Location Map and Site Map for the Study Area. These activities include the planned excavation and restoration activities at the Shallow Soil Remedial Unit (RU), the Deep Soil RU, and the Telecommunications Corridor Soil RU. This Transportation Plan was prepared in accordance with the California Environmental Protection Agency Department of Toxic Substances Control (DTSC) *Transportation Plan – Preparation Guidance for Site Remediation* dated May 1994.

1.1 Purpose

The purpose of this Transportation and Traffic Control Plan is to minimize potential health, safety, and environmental risks while loading and transporting contaminated material during the implementation of corrective action activities at the Site. The Transportation Plan will provide the procedures for transportation and disposal of contaminated material to an off-site facility.

1.2 Report Objectives

The objectives of the Transportation and Traffic Control Plan include the following:

- provide a sequence of corrective action activities;
- provide estimated volumes of material to be generated;
- describe the characteristics of the contaminated material to be removed;
- identify the facilities for waste disposal; and
- provide transportation modes and routes for contaminated material.

1.3 Report Organization

The remaining sections of this Transportation Plan are as follows.

- Section 2 presents background information;
- Section 3 provides the sequence of remedial action activities;
- Section 4 presents waste characterization;
- Section 5 presents transportation and loading procedures; and
- Section 6 presents references.

2. Background Information

This section presents a site description and a history of operations at the Site. The regulatory status is also presented below for the Site.

2.1 Site Description

The Site is located in the western portion of the Presidio, approximately 300 to 320 feet above the Presidio lower low water datum of 1907 (PLLW), and sits on a topographic high point on the boundary between the Marina Groundwater Basin and the Coastal Bluffs Groundwater Basin. The Site is delineated by Former Fill Site 5 and the western edge of Washington Boulevard to the west, Kobbe Avenue to the north, and Harrison Boulevard to the east (Figure B1-2). Former Fill Site 5 is located to the west of the Study Area and Former Landfill 4 is located to the east-southeast. The Site is located in the Presidio Forest planning area on the border of the Coastal Bluffs planning area in Area B of the Presidio and is subject to land uses identified in the Presidio Trust Management Plan (PTMP) (Trust, 2002). Current and planned land use at the Building 1349 Area is recreational, with special-status ecological species potentially present (Erler and Kalinowski, Inc - EKI, 2002).

2.2 Operational History

The Building 1349 location was originally occupied by an aboveground storage tank (AST) that was built in 1906 in conjunction with the Presidio-Wide Fuel Distribution System (FDS). The AST was used to store fuel-heating oil that was distributed throughout the Presidio using the former FDS. The AST was approximately 100,000 gallons. The AST was replaced by Building 1349 in the early 1950s. Figure 1-2 identifies the location of the former AST and associated FDS piping. The FDS was decommissioned in sections beginning in the 1940s and ending in the early 1960s.

Building 1349 was a 100,000-gallon steel AST built in the 1950s (identified as Former Building 1349 Tank on Figure 1-2). The AST (Building 1349) was used to store fuel oil and then diesel fuel which was off-loaded to tanker trucks for transportation to various locations in the Presidio.

The United States Army Corps of Engineers (USACE) retained International Technology Corporation (IT) to perform the closure of Building 1349 in 1995. Closure activities occurred in October and November 1995 and included removing Building 1349 and its associated piping and excavating fuel-contaminated soil associated with former fueling operations at the Study Area. IT also conducted an FDS pipeline removal and abandonment project beginning in 1996 and removed the FDS pipelines within the Study Area (IT, 1999).

2.3 Regulatory Framework

As detailed in the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Order No. R2-2003-0080, Building 1349 is a known petroleum site requiring preparation and implementation of a Corrective Action Plan (CAP) (RWQCB, 2003a). The RWQCB Order presents Site Cleanup Requirements (SCRs) for the protection of human health, ecological receptors, and water quality which were used to develop the soil and groundwater cleanup levels in the CAP (BBL, 2006).

The CAP Implementation Work Plan (CAP Work Plan) was prepared in accordance with Task 6 of the RWQCB Order. The CAP and CAP Work Plan also fulfill the California requirements of Title 23, California Code of Regulations (CCR), Division 3, Chapter 16, Article 11. Cleanup levels for the Study Area are specified in the CAP (BBL, 2006). Petroleum contaminant cleanup levels are based on the SCRs listed in the RWQCB Order. Cleanup levels for non-petroleum contaminants are based on the planned land use and site lithology(ies), and are selected in accordance with the *Development of Presidio-Wide Cleanup Levels for Soil, Sediment, Groundwater, and Surface Water* (EKI, 2002) (Cleanup Levels Document).

3. Corrective Action Activities

The following are corrective action activities that will occur during the excavation and removal of the contaminated material. It is anticipated that approximately 1,410 cubic yards of contaminated soils will be removed based on initial excavation limits; however the total volume of soil to be removed will be based on post-excavation confirmation sampling as described in the CAP Work Plan. These corrective action activities are consistent with those described in Section 3.1.1 and 3.1.2 of the CAP Work Plan. Figure B1-2 provides details of the locations of pertinent features and/or components of these corrective action activities. Corrective action activities will generally conform to the following sequence, allowing for repetition of activities as necessary:

1. *Obtain required project-specific permits and perform necessary biological and cultural resource surveys*
2. *Establish Excavation Survey Control*
3. *Establish Work Zones and traffic control devices*
4. *Perform utility survey and clearances*
5. *Establish sediment and storm water control devices*
6. *Establish dust control and monitoring practices and procedures*
7. *Establish equipment decontamination areas*
8. *Establish stockpile location at Building 1347 for excavated material*
9. *Excavate and stockpile contaminated materials*
10. *Perform waste classification sampling per Section 4 and Section 3.2.4.1 of the CAP Work Plan*
11. *Transport and disposal of waste materials at Trust-approved disposal facility*
12. *Import and backfill of certified clean-fill material per Section 3.2.6 of the CAP Work Plan*
13. *Restore excavation areas and monitor post-corrective action erosion control measures per Section 3.2.6 of the CAP Work Plan*

4. Waste Characterization

Waste classification will be conducted in accordance with waste hauler, waste handling facility, and state/federal requirements. Section 3.2.4.1 of the CAP Work Plan describes the waste classification procedures to be used for this project.

5. Transportation and Loading Procedures

This section includes the sequence of remedial action activities, applicable state and federal regulations, waste disposal facilities, transportation modes, hauling routes, traffic control and loading procedures, record keeping, and health and safety procedures.

5.1 State and Federal Regulations

Material excavated from the site is expected to be characterized as non-hazardous and non-RCRA, California hazardous waste. All appropriate state and federal laws and regulations will be followed during the transport and disposal of these materials.

All waste haulers will be fully insured with all applicable licenses, permits, certifications and transporter identification numbers. Truck operators will have current training on both non-hazardous and hazardous transportation requirements and possess the appropriate paperwork.

5.2 Disposal Facilities

Excavated contaminated material will be disposed of at a Trust approved landfill facility. The specific landfill facility will be determined following waste characterization sampling.

5.3 Transportation Modes

The following sections describe the transportation modes for the contaminated soil and construction/demolition type debris.

5.3.1 Loading and Tarping

Contaminated soil will be transported via trucks to an approved waste disposal facility. Trucks with a maximum capacity of 18 cubic yards will be loaded on site with a front-end loader or a hydraulic excavator. Dust will be monitored during excavation and loading activities. If necessary, water will be used to minimize dust generation and reduce the potential for an ambient release of material during the loading process. Tarping will prevent the release of material during transportation.

5.3.2 Haul Routes

When traveling to and from the Presidio, truck traffic will be primarily directed to use California Highway (CA HWY) 101 via the Golden Gate Bridge Toll Plaza Road to CA HWY 101 North and Richardson Avenue to or from CA HWY 101 South. If CA HWY 101 can not be used as a haul route, truck traffic will be directed to use CA HWY 1 (Park Presidio Boulevard). Under no circumstances will truck traffic be directed through the following gates at the Presidio:

- 25th Avenue Gate;
- 15th Avenue Gate; and
- Gorgas Avenue Gate.

Figures B5-1 and B5-2 present hauling routes to and from the Study Area, respectively. Hauling routes are primarily limited to the boundaries of the Presidio. Hauling routes to the approved waste disposal facility will be developed pending approval of the waste classification sampling for disposal.

The following routes were developed for transportation of contaminated soil. As shown on Figure B1-2, off-haul trucks will access the Building 1349 Area by traveling west on Kobbe Avenue from three different routes depending on whether the trucks will be arriving from California Highway 1 (CA 1) south, US Highway 101 (US 101) north or south (see Section 5.3.3). After arriving at the Building 1349 Area, trucks will proceed south on Harrison Boulevard towards the intersection of Washington Boulevard and Central Magazine Road. Trucks will be staged on Central Magazine Road (a Trust-controlled dead-end street) either by backing onto Central Magazine Road or turning and backing off of the entrance to Hunter Road on the southwest end of Central Magazine Road. Trucks may then proceed to the Building 1347 stockpile area by pulling directly onto Harrison Boulevard and proceeding north to Building 1347. If no trucks are waiting for staging on Central Magazine Road, trucks may proceed directly to the Building 1347 stockpile area. The Contractor will be responsible for controlling the dispatch of off-haul trucks to minimize the number of waiting trucks at the work area to the extent practical. After being loaded, dry decontaminated and tarped, trucks may proceed west on Kobbe Avenue to Washington Boulevard and exit the Presidio on CA 1 or US 101, as shown in Figure B1-2 and described in Section 5.3.4.

5.3.3 Hauling Routes Within the Presidio: Directions to Study Area

The proposed hauling routes described below will include the routing haul trucks both ways on a currently one-way street (i.e. Washington Blvd. between Lincoln Blvd. and Kobbe Ave.). The Contractor will provide traffic controls to close this portion of road to non-construction vehicles during those portions of the day that off-hauling activities will occur. The Contractor will use flaggers to direct two-way construction traffic using this portion of Washington Blvd. Pedestrian and bicycle traffic will be controlled in this area by establishing a temporary pathway on the east side of Washington Blvd. between Lincoln Blvd. and Kobbe Ave. during the periods of off-hauling. The following routes will be used by waste haulers to access the Study Area:

Via US-101 North

1. After entering the Presidio and immediately before entering the Golden Gate Bridge tolls, take the San Francisco Exit.
2. Take a slight right onto Merchant Rd.
3. Take a right onto Vista Acc.
4. Take a right on Lincoln Blvd.
5. Take a slight left on Washington Blvd.
6. Take a left on Harrison Blvd
7. Take a left on Kobbe Ave.

Via US-101 South

1. Immediately after crossing the Golden Gate Bridge, take the 25th Ave. Exit.
2. Take a slight right onto Merchant Rd..

3. Take a right on Lincoln Blvd.
4. Take a slight left on Washington Blvd.
5. Take a left on Harrison Blvd
6. Take a left on Kobbe Ave.

Via CA-1 North

1. Merge left onto US-101 N.
2. Immediately before entering the Golden Gate Bridge tolls, take the San Francisco Exit.
3. Take a slight right onto Merchant Rd.
4. Take a right onto Vista Acc.
5. Take a right on Lincoln Blvd.
6. Take a slight left on Washington Blvd.
7. Take a left on Harrison Blvd.
8. Take a left on Kobbe Ave.

5.3.4 Hauling Routes Within the Presidio: Directions from Study Area

After loading is completed, the following routes will be used by waste haulers to exit from the Study Area and the Presidio:

Study Area to US-101 South

1. From the construction site go north on Harrison Blvd.
2. Take a left on Kobbe Ave.
3. Take a right on Washington Blvd.
4. Take a slight right onto Lincoln Blvd.
5. Take a left onto Merchant Rd.
6. Merge right onto US-101 S.

Study Area to US-101 North

1. From the construction site go north on Harrison Blvd.
2. Take a left on Kobbe Ave.
3. Take right on Washington Blvd.
4. Take a slight right onto Lincoln Blvd.
5. Take a left on Vista Acc.
6. Take a left onto Merchant Rd.
7. Merge right onto US-101 N.

Study Area to CA-1 South

1. From the construction site go north on Harrison Blvd.
2. Take a left on Kobbe Ave.
3. Take right on Washington Blvd.
4. Take a slight right onto Lincoln Blvd.
5. Take a left onto Merchant Rd.

6. Merge right onto US-101 S.
7. Merge right onto CA-1 S.

5.4 Traffic Control and Loading Procedures

The following procedures for traffic control and loading will be executed at the Site.

5.4.1 Traffic Control Devices

The Contractor will implement appropriate traffic control devices and signage consistent with those prescribed by the Federal Highway Administration Manual of Uniform Traffic Control Devices, Revision 1, dated November 2004. In addition, the Trust will provide informational signage to be posted at the work area to explain the nature of the work and inform the public of potential presence of hazardous equipment and materials at the work area. The Contractor will provide appropriate warning and other signs commonly used in conjunction with construction activities. Informational and construction warning signs will be posted on each side of the site security fencing as well as on the site security fencing surrounding the Building 1347 stockpile area. The Trust will submit this Traffic Control Plan to the Park Police and Fire Department in advance of excavation work commencing.

Traffic controls are summarized as follows and Figure B1-2 shows the approximate location of these controls:

- Washington Boulevard will be closed between Kobbe Avenue and Harrison Boulevard due to the excavation of the Telecommunications Corridor Soil RU; however, access to the World War II Memorial off of Washington Boulevard will be maintained throughout the duration of the project. Through traffic will be detoured onto Kobbe Avenue and Harrison Boulevard. Appropriate signage will be placed at either end of the road closure. In addition, signage will be placed on Kobbe Avenue and Washington Boulevard to inform vehicles, bicyclists and pedestrians of the road closure and detour in advance.
- Washington Blvd. between Lincoln Blvd. and Kobbe Ave. will be closed to non-construction vehicles and posted with appropriate signage during those portions of the day that off-hauling activities will occur. The Contractor will use flaggers to direct two-way construction traffic using this portion of Washington Blvd. Pedestrian and bicycle traffic will be controlled in this area by establishing a temporary pathway on the east side of Washington Blvd. between Lincoln Blvd. and Kobbe Ave. during the periods of off-hauling.
- Signage will be placed to the west and east of the Study Area on Kobbe Avenue and south of the Study Area on Washington Boulevard to alert vehicular and pedestrian traffic of heavy truck traffic in the vicinity of the Study Area.
- The Trust will use flaggers near the intersections of Washington Boulevard/Harrison Boulevard and Kobbe Avenue and Harrison Boulevard to temporarily hold traffic to allow trucks to turn and maneuver and enter and exit the work zone.

5.4.2 Truck Loading Procedures

The following provides a summary of general truck loading procedures at the Study Area:

- Upon arrival to and departure from the Study Area, truck drivers will sign in and out with the Contractor as they enter the work area from the east on Kobbe Avenue.
- Trucks will be directed to the soil stockpile loading area at Building 1347 if no other trucks are being loaded or staged in line to be loaded.
- If trucks require to be staged, they will be directed onto Harrison Boulevard where they will proceed to the staging area on Central Magazine Road.
- Trucks will be loaded using a front end loader or hydraulic excavator.
- The bed of the truck will be covered with a tarpaulin by the truck driver and/or remedial construction contractor personnel prior to exiting the Site.
- A uniform waste manifest will be prepared for soil prior to the truck exiting the Site. Waste manifests will be carried by waste haulers for all soil hauled from the Site.

Traffic and loading procedures will be repeated as necessary.

5.5 Record Keeping

It is anticipated that based on waste classification sampling results, all material will be manifested with a non-hazardous waste manifest prior to transporting material off site. The following information will be recorded on all manifests:

- Generator's Contact Information;
- Generator's Name and Signature;
- Transporter's Contact Information;
- Transporter's Name and Signature.
- Designated Facility Name and Site Address;
- Facility Signature and Ticket Number;
- Number of Containers;
- Container Type;
- Total Quantity;
- Weight or Volume Units;
- PPE Required;
- Special Handling Instructions; and
- Shipment Date.

The Oversight Manager will complete the waste manifests for the contaminated materials on behalf of the Trust. The Trust will sign the manifests. Appropriate copies of manifests will be compiled and stored in a file by the oversight contractor at the Site.

5.6 Health and Safety Procedures

In accordance with the Site Health and Safety Plan (HASP), no person will be allowed in the work area during site operations without first receiving a site orientation and hazard briefing. This orientation will be presented by the Oversight Manager, and will consist of a review of the HASP. Following this initial meeting, daily safety meetings will be held each day before work begins for site workers. Daily safety meetings will be held to cover the work to be accomplished, the hazards anticipated, protective equipment and procedures required to minimize site hazards, and emergency procedures. The Oversight Manager will present these meetings prior to beginning the day's fieldwork. No work will be performed in an Exclusion Zone before the daily safety meeting has been held. The daily safety meeting will also be held prior to new tasks, and repeated if new hazards are encountered. All people entering site work areas, including visitors, must document their attendance at the site orientation and hazard briefing, as well as the daily safety meeting.

Soil haul truck drivers will receive a separate task-specific safety briefing when they arrive on-site each day and prior to receiving their first load. This safety briefing will be documented in daily truck safety logs.

All visitors, such as regulators, to the work areas must check in with the Oversight Manager. Visitors will be cautioned to avoid skin contact with surfaces, soil, groundwater, or other materials that may be impacted or be suspected to be impacted by constituents of concern. Visitors may proceed on-site only while accompanied by the Oversight Manager or their designee.

Visitors requesting to observe work at the Site must don appropriate personal protective equipment prior to entry to the work area and must have the appropriate training and medical clearances. If respiratory protective devices are necessary, visitors who wish to enter the work area must have been respirator-trained and fit tested for a respirator within the past 12 months.

In the event of an on-site release, emergency procedures will be executed in accordance with the HASP. Prior to the start of operations, the work area will be evaluated for the potential for fire, contaminant release, or other catastrophic event. Unusual conditions or events, activities, chemicals, and conditions will be reported to the Site Supervisor immediately.

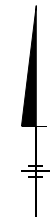
The Oversight Manager will establish evacuation routes and assembly areas for the Site. All personnel entering the Site will be informed of this route and the assembly area.

Transportation personnel will be allowed on site with appropriate personnel protection equipment. Access will be limited to the Contamination Reduction Zone and Support Zone. Transportation personnel will not be permitted in the Exclusion Zone as defined in the HASP.

6. References

- State of California Department of Transportation, 1996 and revised 2003. *Manual of Traffic Controls for Construction and Maintenance Work Zones*. November 20.
- EKI, 2002. *Development of Presidio-wide Cleanup Levels for Soil, Sediment, Groundwater, and Surface Water*. October.
- IT, 1999. *Fuel Distribution System Closure Report, Presidio of San Francisco, California, Volumes 1 through 3*. May.
- Montgomery Watson, 1995a. *Draft Building 1349 Site Investigation, Final Site Investigation Report, Presidio of San Francisco, California*. January.
- Montgomery Watson, 1996. *Final Building 1349 Additional Site Investigation Report, Presidio of San Francisco, California*. May.
- RWQCB, 1996. *Order No. 96-070, Site Cleanup Requirements (SCRs)*.
- Treadwell & Rollo, 2003a. *Draft Site Investigation Report, Building 1349 Study Area, Presidio of San Francisco*. October.
- Trust, 2002. *Presidio Trust Management Plan, Land Use Policies for Area B of the Presidio of San Francisco, California*. May.

Figures



NOTES:

1. DRAWING NOT TO SCALE.
2. DATA OBTAINED FROM: DRAFT SITE INVESTIGATION REPORT, TREADWELL AND ROLLO, OCTOBER 2003.

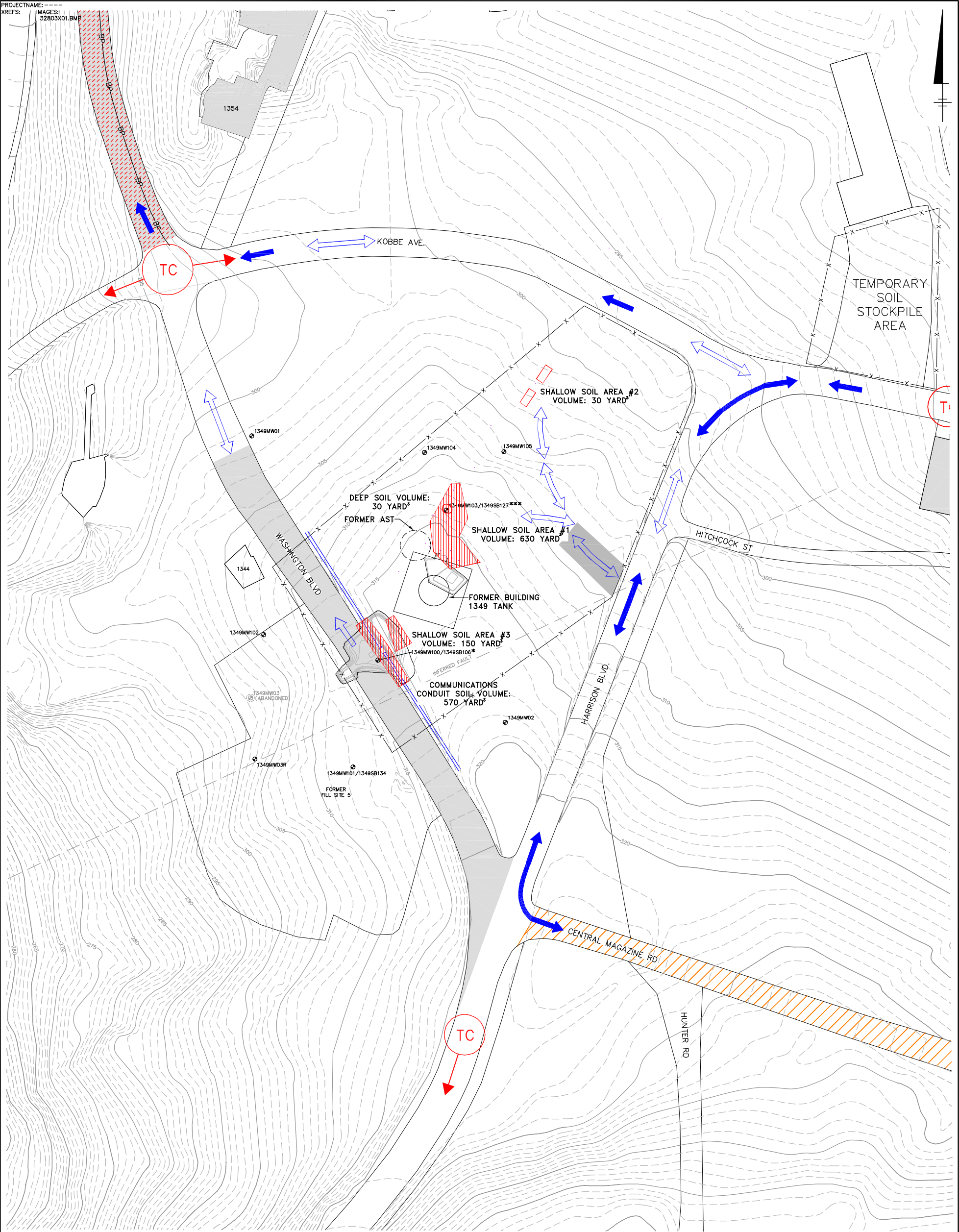
BUILDING 1349 STUDY AREA
THE PRESIDIO TRUST
SAN FRANCISCO, CALIFORNIA
CORRECTIVE ACTION PLAN
IMPLEMENTATION WORK PLAN

SITE LOCATION MAP



BBL
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

FIGURE
B1-1



NOTES:

- WASHINGTON BLVD. WILL BE CLOSED FROM HARRISON BLVD. TO KOBBE AVE. TRAFFIC CONTROL SIGNS WILL BE INSTALLED DETAILING ROAD CLOSURES AND DETOUR ROUTES.
- 1349SB106 WAS CONVERTED INTO MONITORING WELL 1349MW100 ON 24 SEPTEMBER 2002.
- 1349SB134 WAS CONVERTED INTO MONITORING WELL 1349MW101 ON 2 MAY 2003.
- 1349SB127 WAS CONVERTED INTO MONITORING WELL 1349MW103 ON 20 APRIL 2003.

LEGEND:

- GROUNDWATER MONITORING WELL
- COMMUNICATIONS CONDUIT
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL: 5 FT) (CONTOUR INTERVAL: 1 FT)
- PROPOSED SOIL EXCAVATION AREAS
- ROAD CLOSURE
- ROAD CLOSURE DURING OFF-HAUL TRUCKING ONLY
- BIKE/PEDESTRIAN LANE DELINEATOR DURING OFF-HAUL TRUCKING ONLY
- TC TRAFFIC CONTROL DEVICES
- SOIL STOCKPILE TRUCK HAUL ROUTES
- OFF-HAUL TRUCK ENTRY, EXIT, AND STAGING ROUTES
- PROPOSED TEMPORARY CHAIN-LINK FENCE WITH WINDSCREEN
- KNOCK-OFF PLATE AND DRY DECON AREA



BUILDING 1349 STUDY AREA
THE PRESIDIO TRUST
SAN FRANCISCO, CALIFORNIA
CORRECTIVE ACTION PLAN TRANSPORTATION PLAN

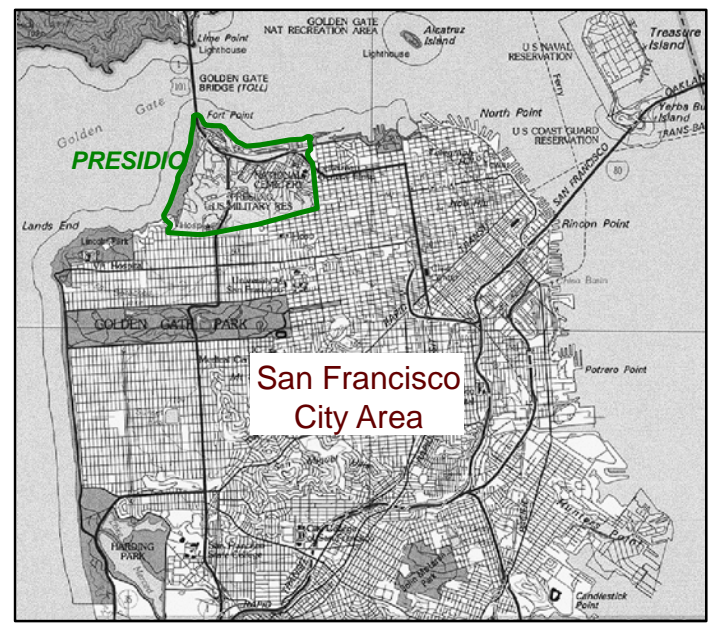
SITE MAP





- POTENTIAL ENTRY AND EXIT ROUTES/GATES:**
- VIA GOLDEN GATE BRIDGE TOLL PLAZA
 - VIA DOYLE DRIVE AND HIGHWAY 101
 - VIA 19th AVENUE/STATE HIGHWAY 1
 - NO ENTRY OR EXIT VIA 25th AVENUE GATE, 15th AVENUE GATE OR GORGAS GATE
 - NO LEFT FROM LINCOLN BLVD.

- LEGEND:**
- ROUTE VIA US-101 NORTH
 - - - ROUTE VIA US-101 SOUTH
 - · · · · ROUTE VIA CA-1 NORTH



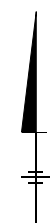
- NOTES:**
1. DRAWING NOT TO SCALE.
 2. DATA OBTAINED FROM: DRAFT SITE INVESTIGATION REPORT, TREADWELL AND ROLLO, OCTOBER 2003.

BUILDING 1349 STUDY AREA
THE PRESIDIO TRUST
SAN FRANCISCO, CALIFORNIA
**CORRECTIVE ACTION PLAN
IMPLEMENTATION WORK PLAN**

**POTENTIAL HAUL ROUTES
INBOUND WITHIN THE PRESIDIO**

BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

**FIGURE
B5-1**

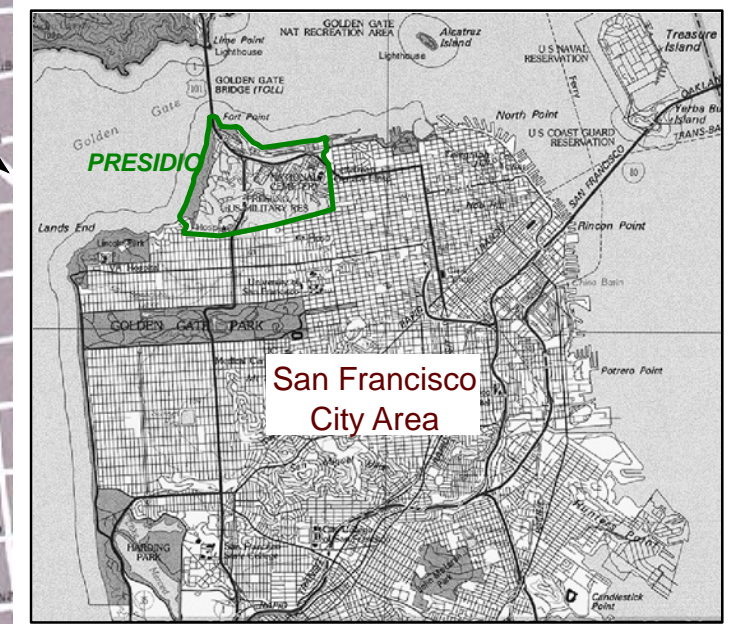


POTENTIAL ENTRY AND EXIT ROUTES/GATES:

- VIA GOLDEN GATE BRIDGE TOLL PLAZA
- VIA DOYLE DRIVE AND HIGHWAY 101
- VIA 19th AVENUE/STATE HIGHWAY 1
- NO ENTRY OR EXIT VIA 25th AVENUE GATE, 15th AVENUE GATE OR GORGAS GATE
- NO LEFT FROM LINCOLN BLVD.

LEGEND:

- ROUTE ON PRESIDIO SURFACE STREETS
- ROUTE VIA US-101 NORTH
- ROUTE VIA US-101 SOUTH
- ROUTE VIA CA-1 NORTH



NOTES:

1. DRAWING NOT TO SCALE.
2. DATA OBTAINED FROM: DRAFT SITE INVESTIGATION REPORT, TREADWELL AND ROLLO, OCTOBER 2003.

BUILDING 1349 STUDY AREA
THE PRESIDIO TRUST
SAN FRANCISCO, CALIFORNIA
**CORRECTIVE ACTION PLAN
IMPLEMENTATION WORK PLAN**

**POTENTIAL HAUL ROUTES
OUTBOUND WITHIN THE PRESIDIO**

**FIGURE
B5-2**

Appendix C

Emergency Contacts

1. Emergency Contacts

In the event of an emergency, the means to summon local public response agencies such as police, fire, and ambulance are identified in Table C 1-1.

TABLE C 1-1
Emergency Contacts

LOCAL EMERGENCY CONTACTS	PHONE NUMBER
Park Emergency Dispatch	(415) 561-5656
Fire Department Non-Emergency	(415) 561-5656 (415) 561-5505
Local Police	(415) 561-5656
Ambulance	(415) 561-5656
PROJECT EMERGENCY CONTACTS	PHONE NUMBER
Trust Project Manager: Jennifer Yata	(415) 760-1865
BBL Officer in Charge: John Vogeley	(925) 899-8473
BBL Project Manager: Aaron Svitana	(925) 360-2313
Principal Engineer: Neill Morgan-Butcher	(510) 685-2011
Oversight Manager: Hollis Phillips	(510) 219-7764